

**The Final Draft (25% of Total Grade): Due Week 15**

Make sure you completely fill out *all* the information in the sections below. Failure to complete these sections fully and honestly may incur a loss of points. Responding to some questions with “no” or “n/a” or “I don’t know yet” *is* acceptable; however, leaving any responses blank is not. If you do not understand any questions you are encouraged to contact your instructor.

**Section 1**

Name: Janainah Anam

Your Major: International Studies

**Section 2**

On a scale of 1 to 10, how confident are you *now* feeling about writing for this course?

1/ 9/10

I feel much more prepared in terms of writing a research paper now. That is, I know exactly how to start writing one, what language to use and how to structure my paragraphs, among other things. The thought of writing a 10+ page research paper felt so overwhelming at the start of the semester, and it feels a lot less daunting now since I know how to go about writing it.

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**Section 3**

Final grade you received from your previous assignment (Working Draft):

1/ 96/100

#### Section 4

Based on your last assignment and the lessons you have received so far in ENG 204, what **three** things have you given extra care and attention towards for this assignment?

1/ I made sure to incorporate all the feedback from previous assignments + Auto-Peer.

2/ I tried (really hard) to improve my comma usage.

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they're hard 😞

3/ I paid more attention to my topic closers and wound up changing many of them.

**Checklist**

Before submitting, make sure that you can write “YES” for each of the items below.

1/ I understand that if I write “YES” to any of these statements then such a response is completely true. I further understand that if there is evidence that I have not responded accurately then my paper will be returned to me ungraded. In such a case, I will have to correct my paper and resubmit it. In so doing, I will be subject to a “late penalty.”

- YES

2/ I have accurately and fully completed an Auto-Peer review of my paper.

- YES

3/ I have named the file for submission as follows: Working Draft [my iLearn name]

For example: Final Draft Philip Michael McCarthy.

- YES

4/ The file I am submitting is a Microsoft Word document.

- YES

5/ I have read the rubric and all relevant course material, and included all the information required.

- YES

6/ I have changed the header of this paper to the ALL CAPS title of my paper.

- YES

7/ I have pressed spellcheck/grammar check and corrected any text as appropriate.

- YES

8/ I have carefully read *out loud* my entire paper and corrected issues where appropriate.

- YES

9/ I have carefully checked my paper to ensure there are *no* examples of any form of plagiarism. I fully understand what these forms of plagiarism are and I realize fully that any examples of plagiarism will have severe consequences (including *but not limited to* a zero grade, an F for the course, a formal report to administration, and/or having to write a completely new research paper on a different topic). I further confirm that I have had ample opportunity to discuss issues of plagiarism with my instructor and that any and all of my questions have been addressed.

- YES, I have checked my paper

10/ All work submitted in this paper is my own. No other person was involved in any of the actual writing of this paper.

- YES

### **Write Your Paper Below**

Begin your paper at the start of the next page. Note that APA Level 1 and Level 2 headers have *not* been provided for you: You are now required to complete these yourself. Complete the paper using appropriate paragraphs. Remember to leave the rubric at the end of the paper.

### Abstract

The scoring process in figure skating is prone to errors because of its inherent subjectivity. Although there are challenges, AI is a viable tool to reform the scoring system as it can reduce biased judging, eliminate score manipulation, and quicken the scoring process. Figure skating's problems arise from relying on a human panel of judges but in this paper, I argue that AI can mitigate these problems. I also consider alternate claims regarding AI, such as the fact that AI is not truly unbiased, and the disrupting effect it can have on the sport. I further analyse the claim that AI is not competition ready. While these positions have merit, I show that despite the drawbacks, an AI system remains the best solution. The scoring problems present in figure skating have many tangible impacts, and I conclude my paper by emphasizing the need to resolve these problems effectively.

*Keywords:* Code of points, judge bias, figure skating, artificial intelligence, winter olympics

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### A Case for Using AI Technology in Figure Skating

In this paper, I argue that the scoring system in figure skating needs reform. **More specifically, through the implementation of AI technology.** The current scoring system, known as the Code of Points (CoP) system, was introduced in 2004 and was a complete rehaul of the previous 6.0 system. The CoP system was introduced following the 2002 Winter Olympics figure skating scandal, where it was revealed that two judges colluded to predetermine the outcome of the pairs figure skating competition. However, despite the creation and implementation of a new rulebook, some note that the 2004 reforms have not addressed many of the underlying issues still present in the sport (Looney, 2012). This paper will explore how the scoring system in figure skating can benefit from further improvements in the form of the introduction of new technologies.

I support my position on introducing new reforms with the following three arguments. First, the subjectively judged nature of figure skating means that judges may award scores inequitably, based on external factors. In fact, multiple studies have reported cases of judges exhibiting biases such as nationalistic bias or reputation bias in subjectively judged sports, including figure skating (Emerson et al., 2009; Findlay & Ste-Marie, 2004; Zitzewitz, 2012). Second, the structure of the CoP system, allows judges to manipulate certain segments of a skater's score with minimal detection. Looney (2012) argues that some judges manipulate scores by purposefully inflating or deflating the marks in the program components section. Finally, AI technology can make the sport more accessible to viewers by speeding up the scoring process. According to Mazurova et al. (2021), AI technology can expedite the process of real-time judging without compromising on accuracy, thus making the sport more inviting to viewers.

I also consider alternative positions on the subject of introducing scoring reforms in figure skating. First, some argue that AI technology is still in its infancy and may not be a viable option to use in competition (Brady et al., 2022; Liu et al., 2020). Second, I am proposing AI technology as a solution to the biased decision making of human judges, but

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some studies show that AI systems can exhibit their own biases (Srinivasan & Chander, 2021). Third, one problem with the introduction of new scoring instruments is that they may disrupt the sport, and skaters themselves, as it would be a sizable adjustment to make (see Chen & Davidson, 2022). While these positions have merit, I show that many recent studies demonstrate the potential uses of AI or other computerized technology in sports such as figure skating (Bruening et al., 2018; Liu et al., 2020; Mazurova et al., 2021). Regarding the second position, while AI technology does not remain free from bias, it can be programmed to reduce it, and can therefore positively supplement the judging process in figure skating (Srinivasan & Chander, 2021). Last, while there will likely be an adjustment period, I argue that the long-term impact of introducing AI technology will benefit skaters and the sport, not hinder it (see Spitz et al., 2021).

This paper is important because leaving the scoring system in figure skating unchecked could potentially damage the sport. Figure skating is a sport that is most popular every four years, during the Winter Olympics. Outside of the Olympics, it is not a sport that enjoys much widespread popularity, partly because of the aftermath of the 2002 scandal, which has driven many fans away (Garcia, 2018). Therefore, having a scoring system that is unfair, and props up certain skaters based on factors unrelated to their actual performances may drive away potential fans from an already niche sport. Legitimacy is an important element in any sport, and if a sport is perceived as illegitimate, it could alienate viewers.

### **Background**

The scoring system in figure skating underwent a major overhaul following the scandal in 2002. In the aftermath of the scandal, the International Skating Union (ISU) chose to replace the previous 6.0 system with the new Code of Points (CoP) system. The 6.0 system was highly subjective, while the CoP system was created to reduce the degree of subjective scoring. According to the rules of the 6.0 system, “each event was judged by an odd number of judges, and the winner of the event was the skater placed highest by a majority of these judges” (Scoring System, n.d., para. 14). The CoP system has more clearly defined rules and

guidelines on how to judge skaters. In the CoP system, there are two segments that make up the overall score of a performance: the Technical Score and the Presentation Score.

Each element performed by a skater has a numeric value attached to it based on its difficulty. This value is known as the base value (BV) and it is assigned to elements such as spins, jumps, lifts, or step sequences. Judges will then award points based on the quality of the element performed, known as the Grade of Execution (GOE) of the element. The BV and GOE are added together to get the total Technical Score. The Presentation Score is more subjective. The Presentation Score is marked based on the quality of the five program components: Skating Skills, Transitions, Performance, Composition, and Interpretation of the Music. The total segment score is calculated by adding the Technical Score and the Presentation Score, and subtracting any deductions (ISU Judging System, n.d.).

### **The Advantages of Implementing AI in Figure Skating**

Most subjectively judged sports such as diving, gymnastics, and figure skating have been scored by a panel of judges, often with minimal technology. This technology is generally limited to video replays or in the case of figure skating, an ice scope that can measure the height and distance of jumps. In the following sections, I argue that figure skating can benefit from introducing new, computerized technology to aid judging panels. This technology can help reduce bias, ensure fairer scoring, and reduce the time it takes to judge skaters.

#### **Judging Bias**

Biased decision making is common in many sports. More specifically, examples of biased decision making can be found in sports across various categories such as individual sports, team sports and judged sports. The prevalence of bias across sports demonstrates that referees and other sports officials are not always impartial. For example, in football, one study suggests that referees tend to add more injury time at the end of a match if the home team is trailing by a goal (Garicano et al., 2005). Similarly, a study of the 2003 Muay Thai World Championships revealed that judges scored competitors of their own nationality more

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I would argue – that IF an away team is winning (which is HARD to do) ... then they're going to be wasting as much time as possible ... and – that – would lead to the referee adding on time ... so ... I WOULD actually think ... this extra time – is probably right

Doesn't affect your paper – just – made me think 😊

favorably as compared to competitors of a different nationality (Myers et al., 2006). Judging bias is present even at the Olympic level, as evidence of nationalistic bias has been reported across many Olympic sports such as diving, ski jumping, and artistic gymnastics (Ansorge & Scheer, 1988; Emerson et al., 2009; Zitzewitz, 2006). Thus, it can be surmised that judging bias is commonly found in many sports.

Figure Skating is not exempt from the problems of biased judging. Figure skating judges have been accused of picking favourites since the early days of the sport, indicating that the problem of biased judging is a long-standing one. For example, at the 1906 World Championships in Munich, Swedish skater Ulrich Salchow refused to participate, over concerns that he would be scored unfairly in favour of the Munich born skater, Gilbert Fuchs (Ulrich Salchow, n.d.). While it is impossible to evaluate whether Salchow's claims were true, it is worth noting that Fuchs won the men's event at that competition. More recently, the Cold War saw the emergence of bloc-based voting and bloc bias among figure skating judges. During the Cold War era, judges from NATO countries and Warsaw Pact countries would significantly mark skaters down if they belonged to the opposite defensive alliance, while scoring their countrymen higher in comparison (Sala et al., 2007). These examples highlight that the history of figure skating has been riddled with incidents of judging bias.

Recent studies highlight that biased judging is an ongoing problem in figure skating. Bloc-based judging has receded but nationalistic bias, as well as other biases, have remained a constant. For example, Findlay and Ste-Marie (2004) and Auweele et al. (2004) note that judges frequently award marks to skaters based on their reputation, the marks awarded by other judges, the order they perform in, or their nationality. Furthermore, figure skating judges have exhibited nationalistic biases even at the Olympic level, as demonstrated by Zitzewitz (2006) and Looney (2012). These studies show that the pervasiveness of judging bias is a significant problem that has remained unsolved. However, AI technology can counteract this issue. That is, AI systems are free of many of the biases and problems that are

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again – just thinking out loud 😊

**Commented [PMM7]:** And I have a feeling that Ukraine will be winning the Eurovision song contest tonight ... regardless of how well they perform

inherent in human judging panels. According to Mazurova et al. (2021), AI systems are not biased regarding factors such as reputation or nationality. The authors further note that AI mitigates the human biases and inefficiencies that can influence the judging process. Therefore, the introduction of AI can help solve the decades-old problem of judging bias.

### **Score Manipulation**

The scoring issues meant to have been addressed by the 2004 scoring reforms persist in figure skating. According to the ISU, the scoring system was reformed to limit the possibility of judge collusion and increase the fairness of the scores awarded. One novel aspect of the newly introduced CoP system was the 'Program Components' section, which has presented its own set of problems. Program components cover the artistic side of figure skating such as skating skills, interpretation of the music and transitions, and are a part of the Presentation Score (ISU Judging System, n.d.). As discussed in Lom (2016), the CoP system was specifically created with clear and rigid guidelines to limit the marks a judge could grant subjectively. However, Looney, (2012) argues that the new system is not without faults. Since the program component section of the new scoring format allows for some degree of subjectivity, it is also easily manipulable by judges. In fact, the evidence presented in the study suggests that judges *do* use the program components section to artificially inflate or deflate scores.

These persisting issues have had significant consequences on individual athletes in the sport. Osorio (2016) notes that subjective judgements are almost inherently open to manipulation. There is evidence of the same, occurring in figure skating. Looney (2012) describes how in the lead-up to the 2010 Olympics, there were questions about the validity of certain scores that were given. More specifically, Evgeni Plushenko, a gold medal contender at the time, commented that judges gave skaters who had no transitions in their programs like himself, high transition marks to manipulate the scores. Similar questions arose during the subsequent 2014 games when the scoring came under public and media scrutiny once again.

According to Looney and Howell (2015), it was believed that two Russian skaters (Plushenko again, and Adelina Sotnikova, the eventual gold medalist) were given inflated scores because the judging panel was largely made up of judges from former Soviet countries, implying a conflict of interest. Therefore, the fact that score manipulation is present even at the highest level of the sport, demonstrates that the issue must be tackled.

The literature suggests that AI can adequately tackle the issue of score manipulation. Limiting human involvement in the scoring process means that there is less opportunity for the scores to be falsely manipulated. Indeed, Brady et al. (2022) argue that a well-programmed AI system can help make judgments in sports appear fairer to fans, judges, and athletes alike. AI can also ensure fair and equal judging globally, by bringing uniformity to the scores awarded across competitions. The authors further highlight that figure skating is one of many aesthetic sports that could reap the benefits of an AI system as it would reduce some of the subjectivity, thereby limiting the sport's vulnerability to score manipulation. Adding to this position, Leveaux (2012) as cited in Mazurova et al. (2021) notes that technology can make decisions in sports more transparent, and subsequently more correct. Thus, AI technology is one solution to the problem of score manipulation.

#### **AI Can Quicken and Improve the Accuracy of Judging**

Making quick judgements is an important factor in almost any sport. When the Video Assistant Referee (VAR) technology was introduced in football, many were concerned that it could increase the time taken to officiate, and lengthen matches (Chen & Davidson, 2022; Spitz et al., 2020). Longer decision-making times are undesirable in sports as it can be exhausting for athletes to undergo long waits. Long decision-making times could also make a sport less spectator-friendly for both live, and television audiences (Mazurova et al., 2021). In fact, sports that are not fast paced tend to gain the reputation of being boring sports. For example, the long pauses and infrequent moments of action in baseball have led many to perceive it as a boring or slow sport (Orlin, 2014). With the popularity of figure skating not

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being as high as sports like football and baseball, quicker judging could be important in making the sport more enticing to viewers.

Although slow judging is not uncommon in sports, AI has the potential to improve and speed up the scoring process in figure skating. According to Mazurova et al. (2021), humans' ability to process information is inherently slow, while some of the strengths of AI include speed and efficiency. The article goes on to suggest that AI could even outperform humans in cognitive tasks. Furthermore, the authors highlight that AI effectively eliminates many factors that can influence human judging such as fatigue and tiredness. In other words, AI is not susceptible to the external forces that affect humans. Adding to this position, Brady et al. (2022) explain that the use of AI in sports like Formula One has demonstrated that AI can make decisions faster than humans can. These studies indicate that AI is an effective way to quicken the pace of figure skating.

#### **The Disadvantages of Implementing AI in Figure Skating**

Although AI technology has the potential to positively impact the sport, some argue that such changes to the scoring process can have unwanted side effects. These opposing viewpoints range from fears that it could hamper the sport to concerns such technology is not up to par to be used in actual competition. Although these arguments are not without merit, I show that the benefits of AI outweigh these concerns.

#### **Disruptions to the Sport**

Some contend that changes to the scoring system could disrupt the sport and skaters themselves. This position is not without merit as the 2004 reforms also raised concerns among skaters. That is, some skaters were concerned that the new scoring system could devalue the artistic component of skating and instead emphasize technical elements (Zitzewitz, 2006). These concerns appear to have been realized as multiple skaters agreed with one judge's view that the presentation side of skating has been impacted by the CoP system (Lom, 2016). Introducing novel technology to the sport could generate similar views among skaters today, as has been the case in other sports. For example, in football, the

implementation of the VAR system has come with its own share of the kind of controversial decisions it was meant to prevent (Chen & Davidson, 2022). Similarly, in tennis, some have questioned the accuracy of Hawk-Eye technology, particularly during the early days of its implementation in the sport (Sanderson, 2008). Thus, the transition to a different scoring system may not be seamless but is still necessary to implement.

Despite the side effects, I argue that the long-term benefits of implementing AI systems will override any short-term drawbacks. According to Mazurova et al. (2021), AI can mitigate many of the problems with figure skating scoring that have been outlined in previous sections. The study highlights that AI can overcome issues of judging bias, transparency, accountability, and adaptability. Studies by Emerson et al. (2009), Looney and Howell (2015) and Mazurova et al. (2021) have demonstrated that the continued presence of such issues in sports can negatively impact athletes in many ways, including by altering medal placements. The fact that AI can solve these issues suggests that, in the long-term, the impact of AI will largely be positive. Furthermore, Singh Bal and Dureja (2012) and Spitz et al. (2020) have shown that the Hawk-Eye system in tennis and VAR in football have been beneficial to each respective sport, despite the controversies. Therefore, AI in figure skating is likely to have a positive impact on the sport in the long term.

### AI Technology ~~is~~ Under Development

There are arguments made by some that suggest that the current level of AI technology is not fit for use in competition. For example, Liu et al. (2020) note that the development of action recognition and deep learning have been slow within competitive sports. This finding is significant, as action recognition and deep learning are important subfields within the field of AI. In addition, Brady et al. (2022) highlight that the development of AI, and the effects it will have on competitive sports, can only be measured in the forthcoming years, as AI is still not fully developed within sports. These studies

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demonstrate that while progress has been made, the utilization of AI within sports has been a slow process. As a result, the argument that AI is not competition-ready is not without merit.

Although AI cannot be introduced immediately, it can be introduced eventually. That is, I argue that while AI is not an immediate solution, it could certainly be an option for the near future. The International Federation of Gymnastics is in the process of developing an AI-powered judging system for gymnastics, a sport with many similarities to figure skating (Mazurova et al., 2021). Furthermore, multiple studies have highlighted the viability of using new technology to score skaters. For example, a wearable jump monitor that can measure elements of a figure skating jump such as jump height, jump identification and number of revolutions has shown promising results with minimal inaccuracies (Bruening et al., 2018). In addition to new technology, multiple figure skating datasets have been created that are useful for machine learning, an important element of AI technology (Xu et al., 2020; Liu et al., 2020). Therefore, these developments illustrate the potential ways AI can be implemented in figure skating.

### **Bias in AI**

Some critics may argue that AI systems are not free from bias. It is not untrue that AI can exhibit its own set of biases that are different from human biases. According to Mazurova et al. (2021), AI could be biased in undetectable ways, as compared to human biases. The authors note that gymnasts have different body types and gymnasts from different countries have their respective national styles. An AI-powered system could therefore be partial towards one body type (e.g., shorter gymnasts) or a particular national style (e.g., American vs. Russian). The same can be said for figure skating as different countries coach the sport in different ways, meaning that an AI system for figure skating could be biased in similar ways. Furthermore, Srinivasan and Chander (2021) note that there are a host of biases that can be built into an AI system such as sampling bias, measurement bias, and human evaluation bias.

Although AI contains its own unique biases, it does eliminate almost all human biases. That is, AI remains free from human biases such as bloc-based bias, nationalistic bias

or reputation bias. In addition, an AI system can mitigate the human inefficiencies that could intentionally or unintentionally contribute to the creation of such biases (Mazurova et al., 2021). Despite the elimination of human biases, AI indeed contains biases of its own. However, unlike human biases, biases within an AI system can be managed to some extent. While it is not possible to eliminate all biases from an AI system, efforts can be made to mitigate or reduce them (Srinivasan & Chander, 2021). In fact, multiple studies examine how biases can be mitigated in AI systems (see Mehrabi et al., 2021). While AI may not be a perfect solution, it inarguably is a feasible one.

### Conclusion

In this paper, I argued that AI technology is a possible solution to the problems that are present in figure skating's CoP scoring system. Finding a solution to the scoring problems is a necessary step because leaving these problems unchecked could hurt the sport in the long run by making it less compelling to watch. Therefore, implementing an AI system in competition can mitigate, if not eliminate the many problems associated with having a human panel of judges and raise the overall quality of the sport. AI is free from human biases such as reputation bias, nationalistic bias and bloc-based bias. AI also eliminates the possibility of artificial score manipulation, which is common in subjectively judged sports. Furthermore, AI can improve the real-time scoring process by making it quicker, and as a result, more enjoyable for viewers.

Despite the many benefits of using an AI system to score athletes, AI is not a perfect solution. First, AI skeptics may argue that introducing novel technology and altering the very role of judges in the sport could have a disruptive effect on athletes. ~~On the contrary~~In fact, this paper demonstrates that technological changes that improve a sport in some manner are beneficial in the long term regardless of any short-term pushback. Second, some may point to the relative newness of AI in citing why it is unsuitable or insufficient for use in competition. Regarding this position, the evidence strongly suggests that while AI may not be an instant solution, it has undergone enough development to be used in the near future. Finally, AI may

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be free from human biases, but it is not free from all biases, as it can still exhibit specific biases of its own. However, unlike humans, AI systems can be programmed differently and, in this case, can be programmed to mitigate these biases.

The available evidence highlights that figure skating is a sport with many deeply rooted problems that have been allowed to fester. Over the years, there have been judging scandals, contentious scoring decisions, and most recently, a doping scandal at the Olympics. No sport is free from such issues, but in figure skating, some of the issues can be mitigated using AI. For example, in football, VAR does not eliminate a referee's dubious calls, but it certainly reduces the possibility of such calls. Similarly, AI can address the major difficulties that arise with having a panel of judges. Problems such as doping are not always easy to prevent but scoring problems are preventable, to a certain degree. Leaving the question of scoring unaddressed, could prove damaging in the future, as it invites the possibility of future scoring controversies. Therefore, AI is an important tool that can help keep figure skating fair and prevent the erosion of its perceived legitimacy.

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So interesting!

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Here's the details ...  
do it! LOL

<https://www.asrarjournal.com/submit>

Submit the paper there by 5pm Monday, May 30<sup>th</sup> 😊

You've been amazing 😊  
Thank you for ALL THE HARD WORK – truly appreciated!

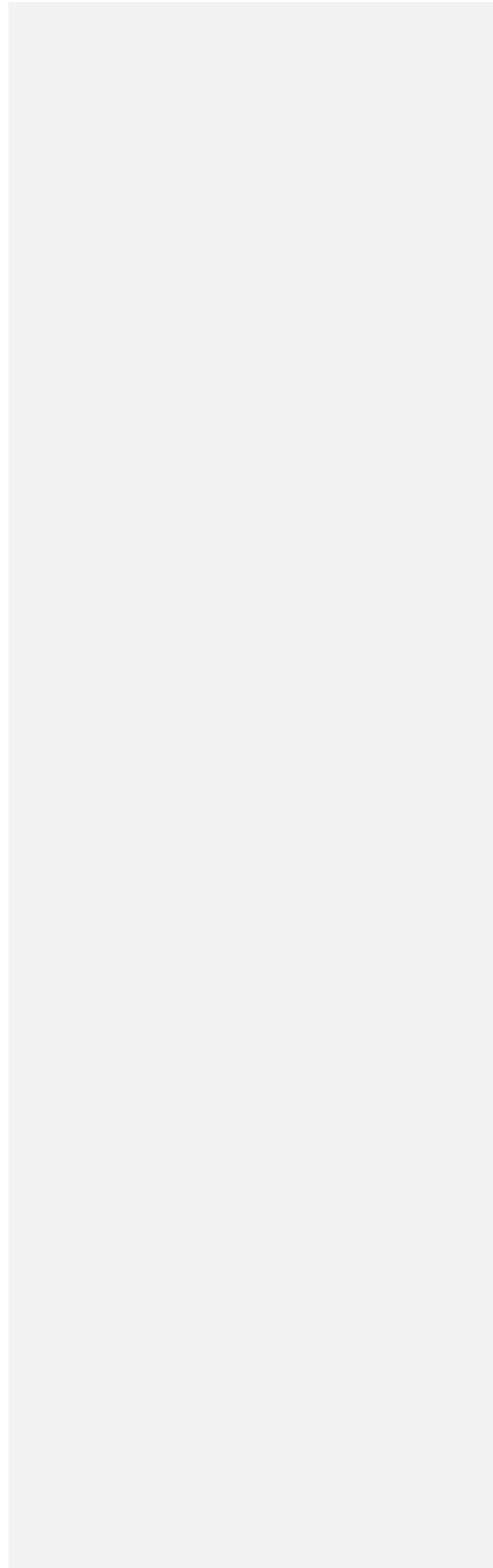
Have a GREAT summer!

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The Final Draft will be evaluated based on the rubric below as well as all materials, instructions, and feedback provided by the instructor. Note that evaluations assume good punctuation, word choice, grammar, presentation, and strength of arguments. Evaluations also assume an appropriate quality of writing, length of response, and that language issues discussed in class have been followed appropriately. Points will be deducted if these assumption are not met. Points will also be deducted if the template has not been completely and appropriately filled out, or if any item from the template is missing. A further points' deduction will occur if an incorrectly named file is submitted.

**Rubric for Evaluating the Final Research Paper**

**Final Research Paper**

The final research paper is 10-12 pages (3200 – 3850 words, excluding reference list, abstract, and title page) and incorporates feedback from the drafting process.

Elements		Points
<b>Content</b>		
	<b>Title Page</b>	
	<b>Abstract and Key Words</b>	/5
	Effectively summarizes research paper (between 130 and 150 words)	
	Lists 3-5 relevant key words	
	<b>Introduction (~1 page)</b>	/5
	Provides appropriate and compelling entry to the topic	
	Clearly articulates the research question(s) and/or thesis	
	<b>Body (~9-11 pages)</b>	/50
	Presents a well-structured, logically-argued, and cohesive discussion	
	Includes headings that reflect the paper organization	

	Supports all points/arguments with credible and relevant evidence and cites definitions of key terms/ideas as applicable	
	Synthesizes multiple sources	
	Shows originality, critical thinking, and in-depth, nuanced analysis	
	<b>Conclusion (~up to 1 page)</b>	/8
	Restates main points and addresses the research question/thesis	
	Comes to logical conclusion from evidence	
	Makes final comment(s)	
	<b>References</b>	/7
	Uses correctly formatted APA in-text citations	
	Includes correctly formatted APA references	
	Contains all and only the cited texts	
	<b>Style</b>	/10
	Entire paper	
	Is polished in tone and style appropriate for an academic audience	
	Uses clear and sophisticated language and variety in sentence structure	
	<b>Mechanics</b>	/5
	Entire paper	
	Is accurate in terms of grammar, spelling, punctuation, capitalization, word choice, and transitionals	
	<b>Format/ Layout</b>	/5
	Entire paper	
	Follows APA page layout (title page, running head, headings, font, etc.)	
	<b>Revision</b>	/5
	Incorporates feedback from the Working Draft and any consultations	

<b>Total</b>		/100
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