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Without My Medal on My Mind: Counterfactual Thinking and Other Determinants of Athlete Emotions

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Abstract
How achievement makes people feel depends upon counterfactual thoughts about what could have been. One body of evidence for this comes from studies of observer ratings of Olympians' happiness, which suggests that category-based counterfactual thoughts affect the perceived happiness of Olympians. Silver medallists are less happy than bronze medallists, arguably because silver medallists think about how they could have won gold, and bronze medallists feel lucky to be on the podium at all. We contribute to this literature by showing that the effect of category-based counterfactual thoughts on Olympians' happiness depends on the margin by which athletes secured their medal. Although gold and bronze medallists appeared happier the better they performed, silver medallists were less happy when they were closer to winning gold. This suggests silver medallists feel disappointed relative to gold medallists but that bronzes do not feel particularly fortunate relative to non-medal winners. Teams were rated as happier than individual athletes and Olympians happier than Paralympians. Observers' ethnic and gender similarity to athletes negatively influence happiness ratings; whilst observers' self-reported happiness has a negligible effect on ratings. We integrate these findings with prior literature on counterfactual thinking and the determinants of happiness, and suggest avenues for future research.

Keywords: counterfactual thinking, close calls, relative status, happiness, Olympic Games
JEL Classifications: D60; I31

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1 Introduction

What are the consequences of doing relatively better or worse than other people? There is a longstanding research practice of investigating this question by studying samples of "eminent" individuals such as Nobel laureates, elite athletes and lottery winners (Simonton, 1999). These studies show there are both benefits and costs beyond the intrinsic value of wins and losses, which can be assessed based on objective or subjective measures of wellbeing. For example, whilst Nobel laureates and Academy Award actors/actresses outlive their nominated peers (Rablen & Oswald, 2008; Redelmeier & Singh, 2001), elite athletes may be more prone to suicide than members of the general population because of the pressure of competition (Lindqvist et al. 2014). In terms of subjective indicators of wellbeing (SWB) or 'happiness', large lottery winners do not necessarily report feeling any better than non-winners (Brickman et al., 1978; Hayward, 2013). Moreover, increases in other people's income generally have a negative effect on SWB likely due to feelings of relative deprivation (Runciman, 1966; Smith et al., 2012) or the anxieties that can accompany upward social comparisons (Buunk et al., 1990).[1]

Olympic athletes have been studied by several researchers in order to examine the effects on SWB of winning a medal, counterfactual thinking (i.e., alternative outcomes to an event) and 'close calls') (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Kahneman & Varey, 1990; Medvec & Savitsky, 1997; Roese, 1997). In a well-known study, Medvec, Madey & Gilovich (1995) found that observers rating video footage of the emotional expressions of athletes during the Barcelona 1992 Olympic Games perceived bronze medal winners (3^{rd} place) as being happier than silver medal winners (2^{nd} place). The authors argued that 3^{rd} place medal winners feel lucky to have received a medal at all, because they think about how they could have been in 4^{th} place and without a medal, whereas 2^{nd} place winners feel they have just missed out because they think about how they could have won a gold medal.

We investigate this argument by studying the perceived happiness of Team Great Britain (GB) medallists at the London 2012 Olympic Games. Our main contribution to the literature is to assess athletes' perceived happiness not only according their relative category of performance (i.e., gold, silver, or bronze), but also according to the margin by which the athletes were placed in that relative category of performance—that is, whether there was a 'close call' with another athlete during the competition. Our findings show that medallists appear happier the better they perform, with the exception of silver medallists, who are happier when they have a 'close call' with bronze medallists. This suggests that the greater happiness of silver relative to bronze athletes is due to silver—not bronze—medallists' counterfactual thoughts about their performance. We

[1]There are, however, some interesting exceptions to this finding where relative income has a positive association with SWB based on race (Davis & Wu, 2014) and urban and household composition in certain cultures (Knight et al., 2009; Kingdon & Knight, 2007). Resource sharing within groups may account for some of the positive effects of relative income, as well as the 'tunnel effect': seeing others like you do better than you serves as a signal that you will do better in the future (Hirschman & Rothschild, 1973).

additionally investigate the roles of being an Olympian or Paralympian athlete and a team or individual competitor on athletes' observed happiness, finding Paralympians and individual athletes to be less happy, with some differences according to medal won. We further find that observers' ethnic and gender similarity to the athletes matters, with similarity according to those characteristics resulting in lower perceived happiness of athletes. Finally, observers' own self-reported happiness does not have a large influence on ratings of athletes' happiness.

2 Background and research questions

2.1 Counterfactuals and Olympic athletes

There is good evidence that counterfactual thinking about an event can affect how we feel in domains ranging from educational success to missing a train (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Kahneman & Varey, 1990; Medvec & Savitsky, 1997; Roese, 1997; Gilbert et al., 2004). Although coming second is objectively better than coming third, there is every prospect that it might not feel that way. An important body of evidence demonstrating this phenomenon comes from studies of the perceived happiness of Olympic athletes. In a well-known study, Medvec et al. (1995) found that observers rating video footage of the emotional expressions of athletes during the Barcelona 1992 Olympic Games perceived bronze medallists as being happier than silver medallists, attributing this finding to reasons relating directly to athletes' counterfactual thinking.[2]

Medvec et al.'s (1995) findings, however, have not gone unchallenged. McGraw, Mellers & Tetlock (2005) analysed data from the Sydney 2000 Olympics, showing that medallists' objective podium positions corresponded with observer ratings of their happiness; i.e., gold medallists were happiest, followed by silver and then bronze medallists. Consistent with the power of relative effects, however, the authors did demonstrate that bronze medallists who were not expected to win a medal—based on predictions reported in *Sports Illustrated* magazine—appeared happier to observers than silver medallists who were expected to win gold. This finding suggests that Olympic athletes' counterfactual thinking is not just about where they could have placed in the event, but also about how well they performed according to expectations of their performance going into the Games.

Other research in this area attempts to code aspects of expressed emotions as a guide to

[2]Note here that although happiness studies frequently rely on peoples' self-reports, sometimes observers' ratings are used. One motivation for doing so dates back to early studies on the validity of those self-reports (Costa & McCrae, 1988; Sandvik et al., 1993; Lepper, 1998). Observer ratings are also used to elicit the happiness among young children (López-Pérez & Wilson, 2015) or people with intellectual disabilities that limit their ability to communicate how they are feeling (Parsons et al., 2011), and when it is difficult to obtain people's own reports (as in studies of athletes discussed in this section).

how people feel. Using the Facial Action Coding System (FACS)—based on the shape of lips, eyes and other facial features (Ekman & Friesen (1978)—Fernández-Dols & Ruiz-Belda (1995) study facial expressions of a sample of only gold medallists at the 1992 Barcelona Olympic Games. Splitting their coding in three phases (waiting behind the podium for the ceremony to commence, standing on the podium, and facing the flagpoles and listening to their national anthem), they find that Duchenne smiles tended to occur most during the second phase on the podium, when medallists were interacting with people. Duchenne smiles are characterised by raising the corners of the mouth, cheeks and 'crinkling' or crow's feet around the eyes. Duchenne smiles are generally considered to be expressions of genuine positive emotion (Davidson et al., 1990; Ekman, Davidson & Friesen, 1990; Papa & Bonanno, 2008), whereas non-Duchenne smiles can mask negative emotion (Ekman, Friesen & O'Sullivan, 1988), although people may be able to produce Duchenne smiles deliberately (Gunnery, Hall & Ruben, 2013). Assuming Duchenne smiles do reflect genuine positive emotion, this research illustrates that expression of the joy of a win is most likely to occur when athletes are standing on the podium.

Tracy & Matsumoto (2008) reported that expressions of pride and shame were similar between congenitally blind Paralympic and non-blind Olympic judo athletes in the 2004 Athens Olympic Games. Congenitally blind athletes are unable to learn these expressions from observing others and so this suggests that there may be an innate biological basis to these emotional expressions. Similarly, Matsumoto & Willingham (2006) code facial expressions of judo athletes in the 2004 Athens Olympics. For events where athletes compete two at a time, victories determining medal allocations are associated with Duchenne smiles, while defeats (silver medallists losing to gold medallists) are linked with sadness, contempt, or no emotions at all. The results are similar during the medals award ceremony, where both gold and bronze winners tend to have Duchenne smiles, whereas silver winners tend to have more controlled facial emotions. This is further evidence that both absolute and relative status matter to how an athlete feels whilst on the podium.

This study aims to enrich our understanding of the relationship between relative success and SWB by focusing on observer ratings of the happiness of British Olympic medallists at the London 2012 Olympic Games. We first explore, as in prior papers, how happy gold, silver and bronze medallists are perceived to be. We then test our key contribution: whether or not the margin by which athletes won their medal matters for their happiness. We then consider whether competing as an individual versus teams or in the Olympic versus Paralympic Games matters for perceived SWB. Finally, we explore how characteristics of the observers rating the happiness of athletes affect their ratings. We measure athletes' happiness with an agony-ecstasy scale used traditionally in this literature (Medvec et al., 1995; McGraw et al., 2005), but also using a direct happiness question with improved face validity. Our hypotheses relating to each of these areas we explore are set out next, followed by the presentation of the results, and finally the discussion of the findings.

2.2 Research questions

For our first hypotheses we aim to discover the perceived level of happiness experienced by Team GB medallists when on the podium during the 2012 Olympic Games. Following from Medvec et al.'s (1995), McGraw et al. (2005), and Matsumoto & Willingham (2006), our first set of hypotheses are the following:

— *H1: Gold medallists will be rated as happier than both silver and bronze medallists.*
— *H2: Ratings of silver medallists' happiness will be different to bronze medallists' happiness.*

These are followed by more detailed investigations, which are separate considerations but also address the robustness of the findings resulting from these first two hypotheses.

(a) The margin by which athletes won medal

The next issue our study addresses is the margin by which the athletes won their medal. As discussed above, medallists may have both category-based counterfactual thoughts (Medvec et al., 1995) and/or expectation-based counterfactual thoughts (McGraw et al., 2005) that affect how happy they appear on the podium. We propose it is also plausible for medallists to have marginal category-based counterfactual thoughts about their performance. These thoughts are about how a medallist could have won a different medal or no medal at all (categories), but also include how close they were to winning a different medal or no medal at all (margins).

For example, consider a competition where there is a small margin between the performance of gold and silver (e.g. Mark Hunter and Zac Purchase in the London 2012 Games; Quarry & Dorney, 2012), but a larger margin between the performance of silver and bronze medallists. Silver medallists may feel unhappy relative to bronze medallists because of thoughts about how they have just missed out on a gold medal based on their performance; and not only because bronze medallists feel lucky to be on the podium relative to those in fourth place, as would be predicted by category-based counterfactual thoughts. Or consider a situation where there is a large margin between the performance of gold and silver medallists, but there is a smaller margin between the performance of silver and bronze medallists. In this case, the bronze medallist may be less happy than the silver medallist because they think about how they have just missed out on a silver medal based on their performance (marginal category-based counterfactual thoughts), rather being happier than silver medallists because they feel lucky to be on the podium relative to those who placed fourth (category-based counterfactual thoughts).

Prior theory and research is suggestive of the idea that marginal category-based counterfactual thoughts about performance can affect happiness and related constructs. Medvec & Savitsky (1997) have shown that students with numerical course grades who just missed out on a higher letter grade—'close calls' (Kahneman & Varey, 1990)—are less

satisfied with their performance on those who have just made a particular letter grade. This can produce a counterintuitive result, where those within one grade category who have done well by the largest margin are the least satisfied with their performance. But Gilbert et al. (2004) show that commuters who have missed their train by about one minute as opposed to about five minutes—when trains come about every ten minutes—experience similar levels of regret and disappointment, despite independent raters predicting that commuters in the five-minute condition would be more disappointed. The effort, and to some extent the level of competitiveness, involved in a scholastic or athletic context is arguably greater than that in catching a train, however, and so we place more weight on the former evidence than on the latter.

Medvec et al. (1995) discuss how thinking about margins is characteristic of category-based counterfactual thoughts, e.g. "*nearly winning the gold*" (p.606, emphasis added). They also analyse statements made by medallists after performing, finding silver medallists more likely to make statements such as, "*I almost won*", whereas bronze medallists were most likely to make statements such as, "*At least I did this well.*" But this language could refer to either their performance or their position on the podium. The effects of the actual margin of performance on medallists' happiness has not yet been assessed, which could also affect the happiness of medallists based on their relative performance—either in addition to, or instead of, category or expectation-based counterfactual thoughts that are focussed on their relative position on the podium. Based on this concept of marginal category-based counterfactual thoughts, we propose the following hypotheses:

— *H3: Winning athletes in competitions where there was a narrow margin of win will be rated as happier than winning athletes in competitions where there was a large margin of win.*
— *H4: Losing athletes in competitions where there was a large margin of loss will be rated as happier than losing athletes in competitions where there was a narrow margin of loss.*

(b) Individuals vs. teams and Olympians vs. Paralympians

We next explore the question of whether individual or team competitions affect the relative happiness of athletes. On the one hand, according to the old adage 'a trouble shared is a trouble halved', we would expect that athletes who feel troubled that they have lost to have higher happiness if they competed as a team rather than as an individual. Argyle & Martin (1991) investigated the effects of sharing unhappiness by asking participants to talk to others about negative events, finding support for the adage: results that suggested increased happiness and decreased stress and anxiousness as a result of discussing negative events. While this specific study did not find that talking about positive events changed how people felt, others have shown that talking about positive events with others improves wellbeing (e.g., Gable et al., 2004). Whether the event is positive or negative, evidence suggests that talking about it improves how

people feel.

On the other hand, however, there is also evidence for the contrasting adage that 'misery loves company'. Fowler & Christakis (2008) show that among social networks comprised of people such as friends, neighbours and co-workers, having someone in the network become happier (or unhappier) increases the probability that members of their network become happier (or unhappier), too. Although contagion effects are the proposed mechanism in this relationship, it is also possible that people within the network experience similar events and so their emotional experience is similar. In a study of cricketers, however, team members' emotions were associated independently of how well the team was doing, signifying that contagion effects cannot be entirely attributable to shared experiences (Totterdell, 2000). Performing poorly as an individual could be worse in a group, too, due to feelings of letting the group down. Thus, this alternative body of evidence suggests that Olympian medallists' emotions could be magnified by their teammates' emotions, whether positive or negative. Based on this mixed evidence for how others affect our emotional experiences of positive or negative effects, our next hypothesis is as follows:

— *H5: Team medallists will be rated as having different happiness than individual medallists.*

Previous research into the perceived happiness of Olympian medallists has largely neglected an entire category of Olympic athletes: Paralympians, who have encountered unique physical and personal challenges to compete in the Games (an exception is Tracy & Matsumoto, 2008). The effects of challenges such as physical disability on happiness in the prior literature range from positive to negative and also neutral. On the positive side, there is some evidence that past adversity can improve psychological wellbeing by contributing to people's ability to savour the moment (Croft et al., 2014) and/or by improving social connections (Manici, Littleton & Grills, 2015). From these studies we would expect Paralympians to be happier than Olympians. On the negative side, however, Brickman et al. (1978) find that paralysed accident victims reported being significantly less happy with their life at present than controls, which is supported by more recent research showing people with physical disabilities report worse emotional experience than those without across a range of activities (Flores, Ingehaag & Maurer, 2015). From these studies we would likely expect Paralympians to be less happy than Olympians.

But there is also research suggesting that there may be no difference between these groups of athletes. In Hayward's (2013) recent replication of Brickman et al.'s (1978) classic study, she did not find that paralysed accident victims reported being significantly less happy with their life at present than controls. Moreover, there is substantial evidence that people's happiness adapts to physical and personal 'challenges' including physical disability and also bereavement (Loewenstein & Ubel, 2008; Oswald & Powdthavee, 2008; Bonanno, 2004; Dolan & Kahneman, 2008), as well as to 'successes'

such as being hired for a new job and pay rises (Gilbert et al, 1998; Di Tella, Haisken-De New, & MacCulloch, 2010). Such studies would suggest no difference between the happiness of Olympians and Paralympians. Based on this foregoing research, we test whether Paralympians differ in happiness from Olympians, but hypothesise that there could be a positive, negative or no difference between these groups:

— *H6: Paralympian medallists will be rated as having different happiness to Olympic medallists.*

Importantly, the Croft et al. (2014) study is limited by the fact that participants were asked about their past and current experiences of adversity right before they were asked about their savouring ability. Thus, they could have been induced by the question ordering to present themselves as having higher happiness because they experience(d) adversity, and not because they truly experience higher happiness. Whether being asked about adversity prior to being assessed for savouring would leave unchanged, increase or decrease the effect of adversity on savouring is unclear. Our ratings of happiness are independent of our identification of adversity (as Olympian or Paralympian) and thus uniquely contribute to the evidence base in this area.

(c) Similarity of athlete and rater characteristics

It is possible that similarities and/or differences between the characteristics of medallists and raters influence how happy raters perceive medallists to be. The existing evidence has established a clear link between similarity and trustworthiness, demonstrating that people who are similar to oneself are perceived as more trustworthy and are better able to influence opinions and behaviour (Dolan et al., 2012). For example, Durantini et al. (2006) conducted a meta-analysis of the effects similarity between providers and receivers of information intended to reduce risky sexual health behaviours. People were more likely to change their behaviour when someone of a similar age, gender, and/or ethnicity to them delivered the information. In a separate but related literature, it has also been established that people who are perceived as more trustworthy are also perceived as being happier—and causally so, using computer-based face-altering techniques to experimentally modify facial features known to be associated with trustworthiness (Oosterhof & Todorov, 2008; Zebrowitz et al., 2010). As increased similarity increases perceived trustworthiness, and perceived trustworthiness increases perceived happiness, we hypothesise that:

— *H7: The greater the similarity of raters and medallists, the happier medallists are perceived to be.*

Our final consideration concerns the happiness of the raters themselves. Adler et al. (2015) find that in hypothetical scenarios trading-off levels of happiness with levels of other wellbeing aspects—such as income, health, and education—happier respondents tend to prefer scenarios high in happiness. In this context, although there have been

many studies on the relationship of self-ratings of happiness with observer ratings of happiness (see Schneider & Schimmack, 2009 for a meta-analysis), these studies have generally not assessed whether people who are happier perceive others to be happier, too (for an exception see López-Pérez & Wilson, 2015). This is important because, as noted above, observer studies are used to assess the validity of happiness measures, with a greater correlation between self and observer reports indicating greater reliability. Informants' reports could be different to self-reports of happiness based on the happiness of the observers at the time they are rating. If this is the case, the correlation between self and observer reports could be improved—and in turn, the validity of happiness measures strengthened—by accounting for the happiness of observers. Our final hypothesis thus is:

— *H8: There will be an association between the perceived happiness of Olympians and the happiness of raters.*

3 Data and methods

Video footage of the award ceremony of Team GB medal winners in the 2012 London Olympic and Paralympic Games was obtained from the British Olympic Association (BOA) and the British Paralympics Association (BPA), respectively. In these Games, Team GB was awarded 65 and 120 medals in the Olympic and Paralympic Games, respectively. Of these, BOA and BPA video footage of the awards ceremony was available for 39 (60%) and 74 (61.7%) of the Olympic and Paralympic medallists, respectively. The distribution of gold, silver and bronze medallists by actual number of medals awarded and the available BOA footage from the Olympic and Paralympic Games is shown in Table 1 (see Tables A1 and A2 in the Appendix for further descriptive information related to the available footage).

Table 1: Distribution of medals and available BOA/BPA footage

	Olympic Games		Paralympic Games	
	Actual	Available Footage	Actual	Available Footage
Gold	29	21	34	21
Silver	17	8	43	25
Bronze	19	10	43	28
Total	*65*	*39*	*120*	*74*

Source: www.teamgb.com/games/london-2012; http://paralympics.org.uk/

Footage of the athletes was edited such that medallists' relative standing at the podium was concealed from the subjects rating them; information that could potentially bias observers' ratings. This involved concealing the podium, medal awarded, surrounding athletes on the podium, and any text at the bottom of the screen revealing information about the athlete. These edits essentially led to a clip focused on the facial expressions

of athletes. In addition, videos were muted so that any auditory information would not influence ratings.

In order to avoid experimenter bias that could create a tendency to select information confirming any prior anticipation of the results, the clips were edited to only show the five very first seconds of the awards ceremony starting from the moment athletes stepped onto the podium. This is long enough for an athlete's expression to unfold (Ekman, 2003), and it ensures that all athletes' expressed emotions will be captured during a similar phase; a phase which,as discussed, has additionally been shown to be associated with a tendency for athletes to reveal their facial emotions (Fernández-Dols & Ruiz-Belda, 1995).

Following each video footage, subjects rated medallists' 'happiness' based on the question used in prior research (Medvec et al., 1995; McGraw et al., 2005): "*How would you rate the expressed emotion of the athlete(s) on a scale of 0 to 10, where 0 is agony and 10 is ecstasy?*" The face validity of this measure as one of 'happiness', however, is not straightforward, and so we asked an additional question: "*How would you rate the expressed emotion of the athlete(s) on a scale of 0 to 10, where 0 is not at all happy and 10 is completely happy?*" To facilitate comparisons with prior literature, we primarily report the results as measured by the agony-ecstasy item; which, following previous research (e.g., Medvec et al., 1995), is loosely referred to here as 'happiness' for consistency purposes. Any differences between the agony-ecstasy ('happiness') measure and the more direct measure of happiness that affect whether our hypotheses are supported or not are reported in the results.

From 7 February to 21 March 2014, 756 individuals participated in this video rating task at the London School of Economics' Behavioural Research Lab. Each individual received a monetary incentive of £20 (as part of an award payment for this study in conjunction with several other studies) and rated a subset of videos randomly selected using Qualtrics software. The average number of videos rated was 49.22 ($sd = 4.11$). Raters first reported how happy they felt before being presented with information about their rating task by answering the question, *"How happy do you feel right now?"* Responses ranged from 0-10. Also prior to rating the videos, the participants were asked basic demographic information, including their gender and ethnicity.

Despite our efforts to conceal information that would communicate the athletes' relative ranking, subjects might be sufficiently informed about sports and be aware of the relative success of an athlete or team they are asked to rate. This could bias the results if raters make their ratings based on their knowledge of whether an athlete received gold, silver or bronze, instead of, or in addition to, their perception of the athletes' happiness. To account for this possibility, we also asked subjects whether they see themselves as being interested in and informed about sports, as well as the last time they watched sports live or on television.

Because each rater rated multiple videos, we conduct ordinary least squares regressions

with standard errors clustered at the rater level. We report any significant differences between the alternative happiness measures, as well as differences after controlling for knowledge of sports.

4 Results

Table 2 provides descriptive information about rater characteristics. The average observed happiness score of all athletes is 6.24 ($sd = 2.11$).

Table 2: Descriptive statistics of raters

Gender (%)	
Male	34.25
Female	65.75
Age (years)	
Mean	23.8
SD	6.21
Min	18
Max	69
Interested in and informed about sports? (%)	
Yes	50.07
No	49.93
Last time watched sports (%)	
Within the last week	33.43
More than a week but less than a month ago	24.39
More than one but less than three months ago	15.06
More than three but less than six months ago	9.9
More than six months ago	17.22

The average happiness score of all gold, silver and bronze medallists is shown in Figure 1. Gold medallists ($\bar{x} = 6.65, sd = 2.10, n_{athlete} = 42, n_{ratings} = 12164$) were rated as significantly happier than both silver medallists ($\bar{x} = 5.92, sd = 2.12, n_{athlete} = 33, n_{ratings} = 10267$; $b = 0.72, se = 0.03, p < 0.001, r^2 = 0.03$) and bronze medallists ($\bar{x} = 6.06, sd = 2.04, n_{athlete} = 38, n_{ratings} = 11717$; $b = 0.59, se = 0.02, p < 0.001, r^2 = 0.02$). Bronze medallists were rated slightly but significantly happier than silver medallists ($b = 0.14, se = 0.02, p < 0.001, r^2 = 0.001$). Thus, hypotheses one and two were supported:

H1: Gold medallists were rated as happier than both silver and bronze medallists.
H2: There was a significant difference between the happiness ratings of silver and bronze medallists, with bronze medallists rated as being a little bit happier.

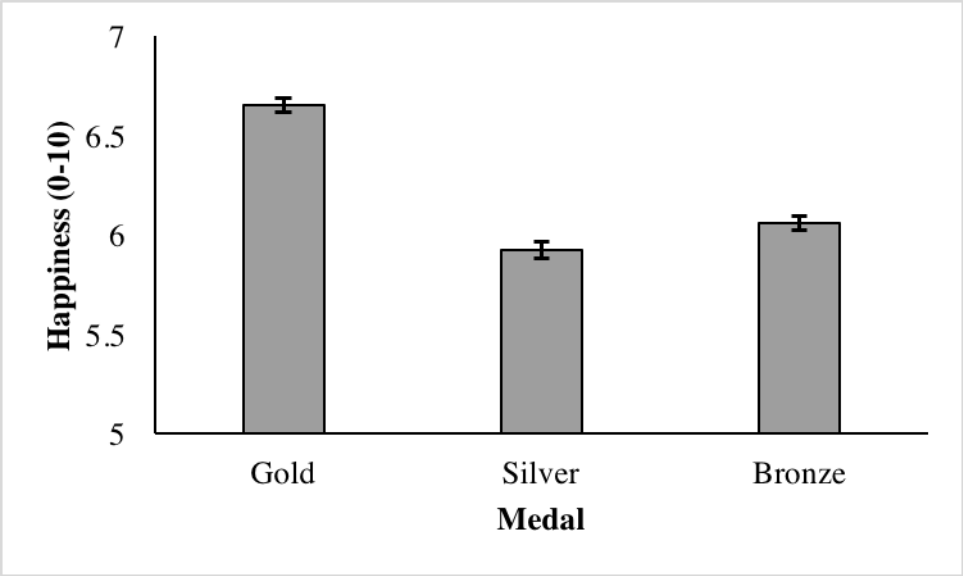

Figure 1: Average happiness by type of medal (95% CI)

(a) Margin by which athletes won medal

We investigate the effects of the margin by which athletes won their medal in two stages. In the first stage, all events were coded according to the relative size of the difference (e.g., in terms of finish time) within events between gold, silver, bronze and 4^{th} places: either the largest, second largest, or smallest (narrowest) difference (see Table A3 in the Appendix for more details regarding this coding exercise). Not all athletes participated in events that could be coded according to this scheme. In two instances (Graeme Ballard's silver and Aled Davies' bronze), the distance between places was identical.[3] In 20 others, medal allocations were not awarded simultaneously; that is, were not cases where medals were awarded based on a competition between two athletes/teams.[4] The important considerations here are: (a) there is a time lag for the bronze medal winner between their victory and award of medal, and (b) participants in the final know they have, at worst, secured the silver medal. These are properties that could arguably influence emotions and thus facial expressions of those in the podium, which do not hold in settings where winning and losing are revealed simultaneously, as for example for the case of the 100m race. Events where medals were not awarded simultaneously, or where the distance between places was identical, were thus excluded from these analyses in this section (4a). This resulted in a sample of 91 medallists. Of the 22 excluded medallists, eight were gold, seven were silver, and seven were bronze.

In the second stage of coding, the events from Table A3 in the Appendix were recoded according to type of medal as opposed to event. Six categories of medallists were created

[3]In Davies' event, the distance between silver and bronze (987-961=16) is identical to the distance between 4^{th} and bronze (961-935=16). In Ballard's event, the distance between silver and bronze (12.26-12.24=0.02) is identical to the distance between 4^{th} and bronze (12.28-12.26=0.02).

[4]To illustrate, consider the case of medals awarded in tennis or judo. A match between two athletes/teams will determine who wins bronze, and a subsequent match determines who wins gold and silver.

according to their relative margin of win:

i. Gold medallists who did not have (relatively) close calls with silver medallists. Gold medallists' marginal performance (relative to silver medallists) was greater than the marginal performance of silver medallists (relative to bronze medallists), which included event types one, two and four from Table A3.

ii. Gold medallists who had close calls with silver medallists. Gold medallists' marginal performance (relative to silver medallists) was smaller than the marginal performance of silver medallists (relative to bronze medallists), which included event types three, five and six from Table A3.

iii. Silver medallists who had close calls with gold medallists. Silver medallists' marginal performance relative to gold medallists was smaller than their marginal performance relative to bronze medallists, which, identically to category two, included event types three, five and six from Table A3.

iv. Silver medallists who had close calls with bronze medallists. Silver medallists' marginal performance relative to gold medallists was larger than their marginal performance relative to bronze medallists, which, identically to category one, included event types one, two and four from Table A3.

v. Bronze medallists who had close calls with silver medallists. Bronze medallists' marginal performance relative to silver medallists was smaller than their marginal performance relative to those in 4^{th} place, which included event types two, four and five from Table A3.

vi. Bronze medallists who had close calls with those in 4^{th} place. Bronze medallists' marginal performance relative to silver medallists was larger than their marginal performance relative to those in 4^{th} place, which included event types one, three and six from Table A3.

The average observed happiness of medal winners according to these six categories is shown in Figure 2. The number of medallists in each category ranged from 12 to 21 with a mean of 15.17 ($sd = 3.54$). Note that in this restricted sample of 91 medallists, silver medallists were slightly happier than bronze medallists ($b = 0.13, se = 0.02, p < 0.001, r^2 = 0.001$).

Our third hypothesis was that winning athletes in competitions where there was a narrow margin of win (relatively close calls) appear happier than winning athletes in competitions where there was a large margin of win (not relatively close calls). To test this, we first consider happiness differences *within* gold, silver and bronze 'winners'. Looking first at gold medallists, who are always winners, those who had close calls with silvers ($\bar{x} = 6.49, sd = 2.16, n_{athlete} = 13, n_{ratings} = 9282$) appeared less happy than those who did not have a close call with silvers ($\bar{x} = 6.85, sd = 2.10, n_{athlete} = 21, n_{ratings} = 14994$; $b = -0.37, p < 0.001, se = 0.04, r^2 = 0.007$). This does not

support the third hypothesis. Next, looking at silver medallists—who are 'winners' compared to bronze medallists—those who had a close call with bronzes ($\bar{x} = 6.28, sd = 2.22, n_{athlete} = 12, n_{ratings} = 8568$) were happier than those who did not have a close call with bronzes ($\bar{x} = 6.06, sd = 1.99, n_{athlete} = 14, n_{ratings} = 996$; $b = 0.22, se = 0.04, p < 0.001, r^2 = 0.003$). This supports the third hypothesis. Finally, bronze medallists—'winners' relative to those who came in fourth—appeared less happy when they had a close call with 4^{th} place ($\bar{x} = 5.90, sd = 2.14, n_{athlete} = 13, n_{ratings} = 9282$) than when they did not have a close call with 4th place ($\bar{x} = 6.20, sd = 2.02, n_{athlete} = 18, n_{ratings} = 12852$; $b = -0.30, se = 0.04, p < 0.001, r^2 = 0.005$). This does not support the third hypothesis.

These findings thus only partially support the third hypothesis:

H3: Winning athletes in competitions where there was a narrow margin of win appeared happier than winning athletes in competitions where there was a large margin for silver medallists only. Gold and bronze medallists were significantly happier when the margin of win was large.

Noting that gold medallists are never 'losing athletes', the implication of partially confirming the third hypothesis in this way is that hypothesis four is also only supported for silver medalists:

H4: Losing athletes in competitions where there was a large margin of loss appeared happier than losing athletes in competitions where there was a narrow margin of loss for silver medallists only (who are losers relative to gold medallists). Bronze medallists (who are losers relative to silver medallists) appeared significantly less happy when the margin of loss was large.

It is evident from Figure 2 that silver medallists are not always less happy than bronze medallists, as suggested by the overall results in Figure 1. Here we are looking at happiness differences *between* silver and bronze medallists, rather than within medallists as in the preceding paragraphs. As noted earlier, in this restricted sample of 91 medallists, silver medallists were slightly happier than bronze medallists overall ($b = 0.13, se = 0.02, p < 0.001, r^2 = 0.001$). Silver medallists are especially happier than bronze medallists who had a relatively close call with 4^{th} place—all silver medallists on average are happier ($b = 0.31, se = 0.04, p < 0.001, r^2 = 0.005$), as are silver medallists who did ($b = 0.39, se = 0.05, p < 0.001, r^2 = 0.008$) and did not have a close call with bronze ($b = 0.16, se = 0.04, p < 0.001, r^2 = 0.002$). Silver medallists are only less happy than bronze medallists when comparing silvers who had a close call with gold and bronzes who had a close call with silver ($b = -0.14, se = 0.03, p < 0.001, r^2 = 0.001$). When comparing silvers and bronzes who were a close call with each other, silvers are slightly happier ($b = 0.09, se = 0.04, p < 0.05, r^2 < 0.0004$), but not significantly so when using the alternative happiness measure ($b = 0.01, se = 0.04, p = 0.79, r^2 < 0.00001$).

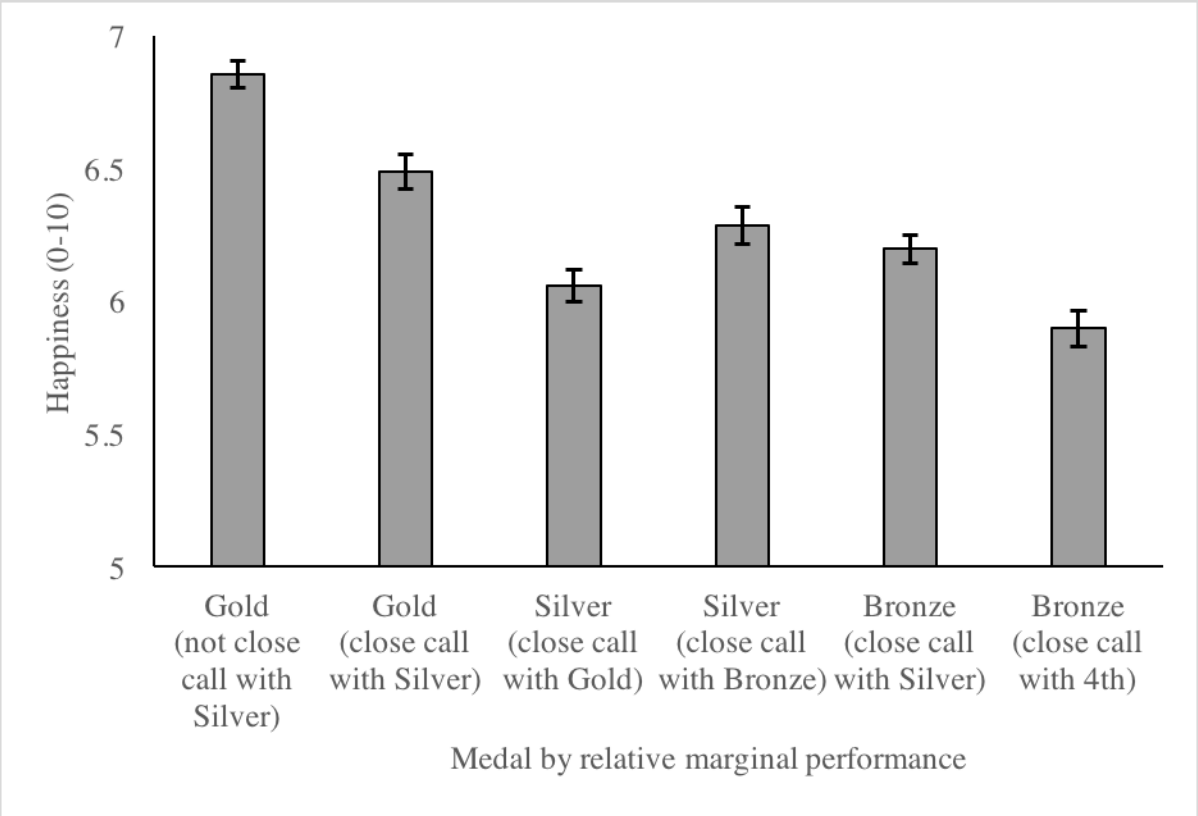

Figure 2: Average happiness by type of medal and relative margin of performance (95% CI)

(b) Individuals vs. teams and Olympians vs. Paralympians

The average happiness score of Paralympians, Olympians, team and individual athletes is shown in Figure 3. Teams' average score ($\bar{x} = 6.44, sd = 2.06, n_{athlete} = 16, n_{ratings} = 4973$) was slightly but significantly higher than individuals' average score ($\bar{x} = 6.21, sd = 2.11, n_{athlete} = 97, n_{ratings} = 30175$; $b = 0.23, se = 0.03, p < 0.001, r^2 = 0.001$), and Paralympian athletes' average score ($\bar{x} = 5.98, sd = 2.04, n_{athlete} = 74, n_{ratings} = 23023$) was significantly lower than Olympians' average score ($\bar{x} = 6.73, sd = 2.15, n_{athlete} = 39, n_{ratings} = 12125$; $b = -0.75, se = 0.02, p < 0.001, r^2 = 0.03$). Thus, hypothesis five was supported, and a component of hypothesis six was also supported:

H5: Team medallists were rated as having higher happiness than individual medallists.
H6: Olympic medallists were rated as having higher happiness than Paralympic medallists.

From Figure 3 it again appears that silver medallists are not always less happy than bronze medallists. In individual sports, there is no significant difference between these groups ($b = -0.03, se = 0.03, p = 0.31, r^2 < 0.00001$). But these results do not hold when using the alternative happiness measure, where silver medallists are slightly less happy than bronze medallists ($b = -0.07, se = 0.02, p < 0.01, r^2 = 0.0003$). Silver medallists are also slightly less happy than bronze after adjusting for knowledge about sports ($b = -0.07, se = 0.02, p < 0.01, r^2 = 0.005$). In the Olympics, silver medallists

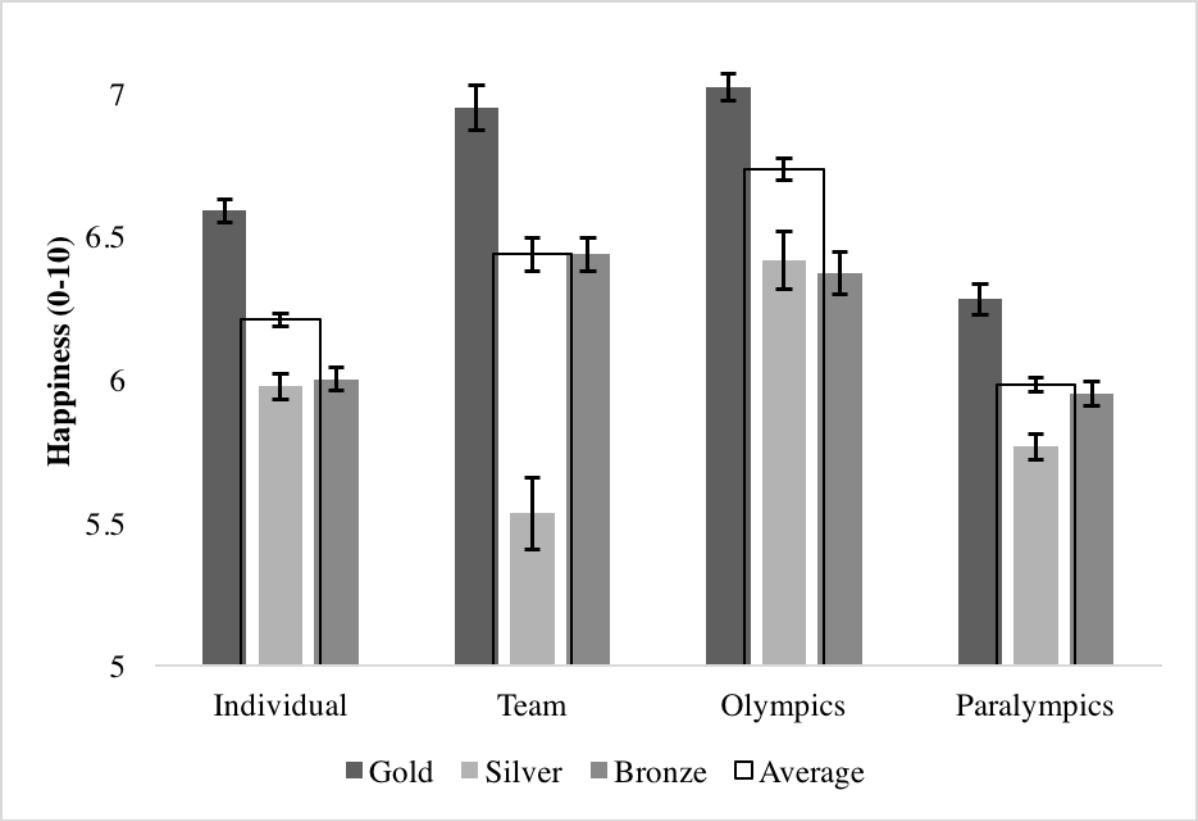

Figure 3: Average happiness by teams/individuals, Olympians/Paralympians, and medal won (95% CI)

are no happier than bronze medallists ($b = 0.04, se = 0.05, p = 0.42, r^2 = 0.0001$). Using the alternative happiness measure, however, silver medallists are less happy than bronze medallists ($b = -0.15, se = 0.05, p < 0.01, r^2 = 0.001$). They are also less happy after adjusting for knowledge about sports ($b = -0.15, se = 0.05, p < 0.01, r^2 = 0.005$). Within teams, silver medallists are less happy than bronze medallists ($b = -0.90, se = 0.07, p < 0.001, r^2 = 0.05$), and silver medallists are also less happy than bronze medallists among Paralympians ($b = -0.18, se = 0.03, p < 0.001, r^2 = 0.002$).

An alternative way of considering these results is to group athletes according to individual and team sports within Olympics and Paralympics, as shown in Figure 4. From this it is evident that in the individual Olympics category—and in contrast to the overall results in Figure 1—silver medallists are happier than bronze medallists ($b = 0.39, se = 0.07, p < 0.001, r^2 = 0.007$). Gold medallists remain significantly happier than silver medallists ($b = 0.26, se = 0.06, p < 0.001, r^2 = 0.003$). Silver medallists are significantly less happy than bronze medallists, and gold medallists are happier than both silver and bronze medallists, among team Olympians, individual Paralympians, and team Paralympians (see Table A4 in the Appendix for further analyses of differences between gold, silver and bronze medallists among team Olympians, individual Paralympians and team Paralympians).

Considering the results from both Figures 3 and 4, team silver medallists are less happy

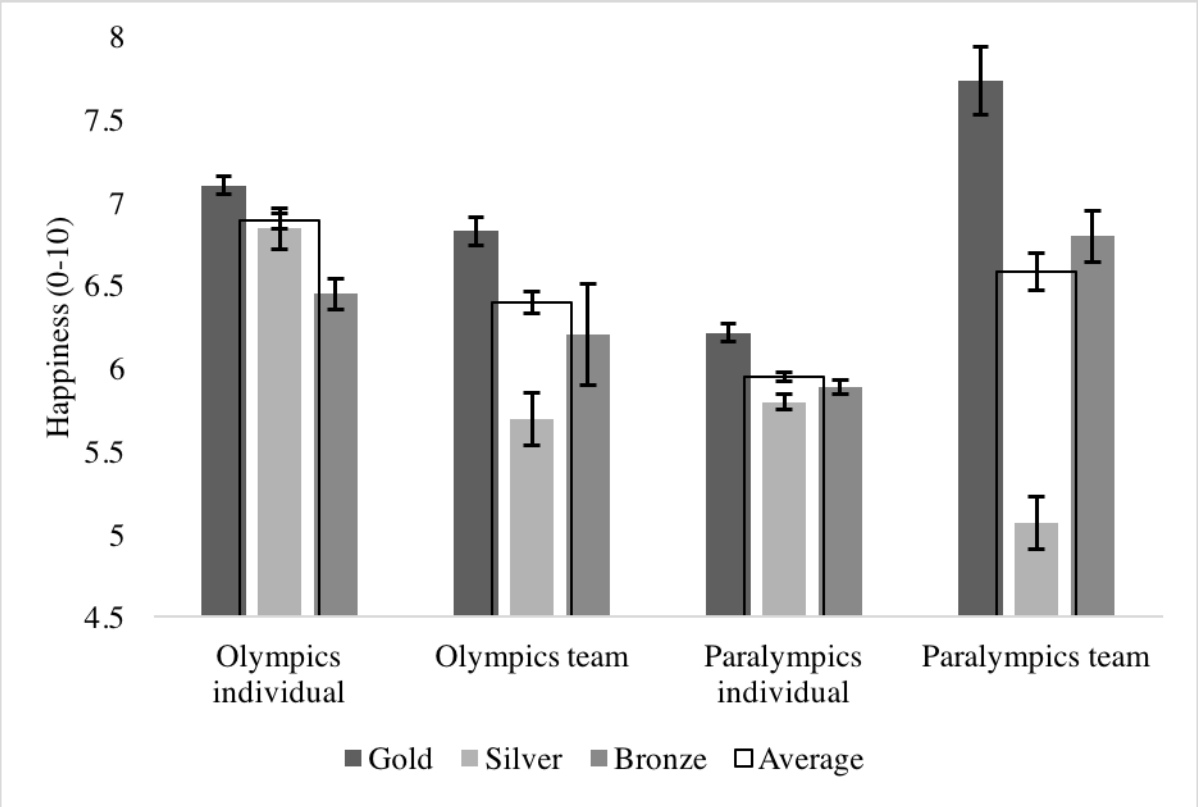

Figure 4: Average happiness by Paralympians, Olympians, teams, and individuals, and medal won (95% CI)

than individual silver medallists, overall ($b = -0.44, se = 0.06, p < 0.001, r^2 = 0.005$), in the Olympics ($b = -1.14, se = 0.09, p < 0.001, r^2 = 0.05$), and in the Paralympics ($b = -0.73, se = 0.08, p < 0.001, r^2 = 0.006$). Gold team medallists were happier than gold individual medallists overall ($b = 0.36, se = 0.04, p < 0.001, r^2 = 0.004$) and in the Paralympics ($b = 1.52, se = 0.10, p < 0.001, r^2 = 0.02$) but not in the Olympics ($b = -0.29, se = 0.04, p < 0.001, r^2 = 0.005$). Likewise, bronze team medallists were happier than bronze individual medallists overall ($b = 0.44, se = 0.05, p < 0.001, r^2 = 0.005$), and in the Paralympics ($b = 0.91, se = 0.07, p < 0.001, r^2 = 0.01$), but not in the Olympics ($b = -0.30, se = 0.06, p < 0.001, r^2 = 0.005$).

(c) Similarity of athlete and rater characteristics

We next consider whether raters who are similar to the athletes rate them as being happier. 'Similarity' is captured based on characteristics that are readily observed: ethnicity (either black and minority ethnic (BME), or other) and gender (male or female). We create four groups based on these characteristics: ethnic similarity (BME raters rating BME athletes or White raters rating White athletes), ethnic dissimilarity (BME raters rating White athletes or White raters rating BME athletes), gender similarity (males rating males or females rating females) and gender dissimilarity (females rating males or males rating females). In keeping with the prior literature on informant hap-

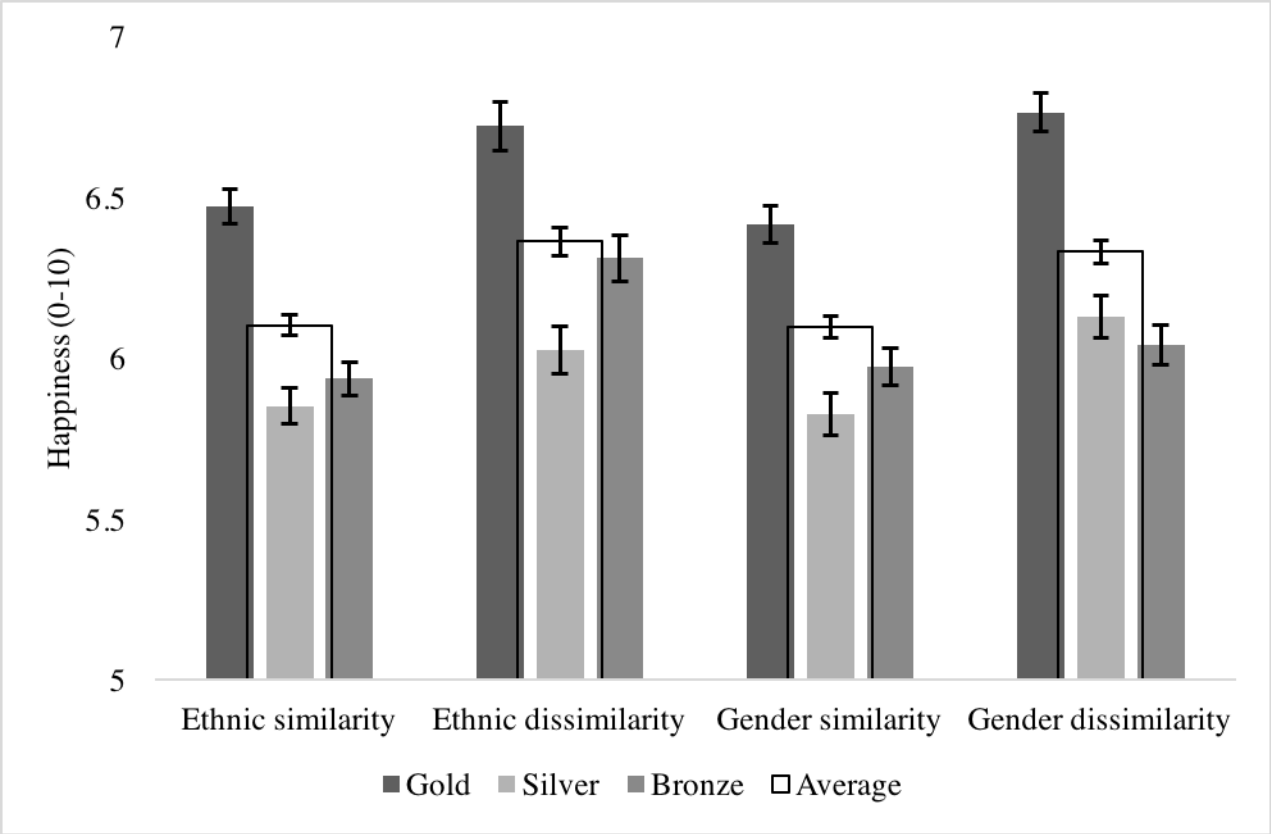

Figure 5: Average happiness by ethnic and gender similarity with the raters (95% CI)

piness ratings (Schneider & Schimmack, 2009), we only analyse individual athletes and not team athletes in this section 4(c).

The average happiness of medallists according to their similarity with the raters is shown in Figure 5. Medallists were rated as happier when they were rated by someone of a different ethnicity ($b = 0.26, se = 0.07, p < 0.001, r^2 = 0.003$), as well as by someone of a different gender ($b = -0.23, se = 0.03, p < 0.001, r^2 = 0.003$). Hypothesis seven is thus not confirmed:

H7: The greater the similarity of raters and medallists, the less happy medallists are perceived to be.

From Figure 5 it is again evident that silver medallists are not always less happy than bronze medallists. When the rater and athlete are of different genders, silver medallists are slightly happier than bronze medallists ($b = 0.09, se = 0.04, p = 0.05, r^2 = 0.03$), although when using the alternative happiness measure, and when adjusting for knowledge about sports, the difference is no longer statistically significant. Gold and bronze medallists are happier than silver medallists in the other groups in Figure 5 (see Table A5 in the Appendix for further analyses of differences between gold, silver and bronze medallists according to ethnic and gender similarity between athletes and raters).

Our final hypothesis concerns the relationship between the perceived happiness of Olympians and self-reported happiness of the raters themselves. Recall from Section 3 that raters

reported how happy they felt at the beginning of the study. There was a significant, yet negligible, correlation between athletes' and raters' happiness ($r = 0.08, se = 0.02, p < 0.001$). Silver medallists were still less happy when controlling for raters' happiness compared to both gold ($b = -0.72, se = 0.03, p < 0.001, r2 = 0.03$) and bronze medallists ($b = -0.13, se = 0.03, p < 0.001, r2 = 0.03$). Hypothesis eight is thus not supported, despite the statistical significance of this finding:

H8: There was a negligible association between the perceived happiness of Olympians and the happiness of raters.

5 Discussion

Thinking about what could have been can lead people to feel differently about their achievements than an objective assessment of what they have achieved might suggest. This study investigated such issues of counterfactual thinking and relative success by analysing observer ratings of Team Great Britain Olympian and Paralympians' happiness during the London 2012 Olympic Games. Prior literature has shown that silver medallists are perceived as less happy than bronze medallists. Silver medallists may think about how they are disappointed not to have made a gold, and bronze medallists think about how lucky they are to be on the podium at all; i.e. 'category-based' counterfactual thinking (Medvec et al., 1995; Matsumoto & Willingham, 2006). Other research suggests that 'expectation-based' counterfactual thoughts matter, too. McGraw et al. (2005) showed that silver medallists who were expected to win a gold medal were less happy than bronze medallists who were not expected to win anything at all.

We proposed that the effect of athletes' counterfactual thoughts about their performance on their happiness may be influenced by the relative margin by which they secured their medal; 'marginal category-based' counterfactual thoughts. Although silver medallists might be less happy than bronze medallists when thinking about how they have just missed out on the gold, if silver medallists have not just missed out on the gold according to their relative performance—that is, if they were closer to being a bronze than a gold medallist—they may be happier than bronze medallists because gold medallists are no longer a relevant comparator group. This is in fact what our analyses suggest. Silver medallists were, on average, slightly less happy than bronze medallists, and gold medallists the happiest of all. This is consistent with the results of Medvec et al. (1995), but not McGraw et al. (2005) who found that silver medallists were happier than bronze.

We also showed, however, that the relative margin of performance appears to matter to the relative happiness of silver medallists. Silver medallists were especially happier than bronze medallists when silvers were closer to being a bronze than to being a gold medallist. It may be that margin-based counterfactual thoughts influence category-based counterfactual thoughts by shifting who is the most relevant medallist with whom

to compare based on similarity of performance. All of these results should, however, be interpreted with caution as performance is not exogenous to the individual, and medallists' happiness could technically be influenced by the same things that influence performance, such as effort and ability.

Interestingly, bronze medallists whose performance was closer to those in fourth place were less happy than bronze medallists whose performance was closer to silver medallists' performance. This is inconsistent with the idea that category-based counterfactual thoughts about being in fourth place affect the happiness of bronze medallists (Medvec et al., 1995). If bronze medallists' happiness was affected by the comparisons they make to fourth place, they should feel happier the closer they are to being in fourth place; after all, they are closer to not being on the podium at all. And so the lower happiness of silvers relative to bronzes appears to come from silvers having category-based counterfactual thoughts about their performance relative to golds, rather than bronzes having category-based counterfactual thoughts about their performance relative to those in fourth place. Instead of bronzes feeling lucky to be on the podium, it appears that silvers are simply disappointed to not have won a gold medal.

While gold and bronze medallists were happier the better that they performed (i.e. when they did not have relatively close calls with silver and fourth place, respectively), silver medallists were not. Silver medallists were less happy when they had a relatively close call with gold, producing the results that more is not always better for silver medallists. These silver medallists are even less happy than bronzes who have a close call with silver, which suggests that marginal category-based counterfactual thoughts only depress the happiness of those 'in the middle', i.e. silvers. When there are no 'close calls' between silver and gold medallists or between silver and bronze medallists, gold medallists are happier than silver, and silver medallists are happier than bronze.

We also do not find silver to be happier than bronze medallists amongst individual Olympian athletes. This contrasts with the findings of prior research using Olympian samples—as in Medvec et al. (1995) and Matsumoto & Willingham (2006)—but it does support the findings of McGraw et al. (2005). In general, the mixed evidence between studies warrants caution about interpreting them as applying to individual Olympians. Our study was the first we are aware of to explicitly test differences between the perceived happiness of Olympian and Paralympian medallists, finding the former to be generally perceived as happier than the latter. This seemingly contrasts with the notion that adversity can improve psychological wellbeing (Croft et al., 2014; Manici, Littleton & Grills, 2015), and also with evidence that people's happiness adapts to physical disabilities (Loewenstein & Ubel, 2008; Oswald & Powdthavee, 2008), but is consistent with research showing people with physical disabilities have worse emotional experience than those without (Flores, Ingehaag & Maurer, 2015). Of course, raters may simply have perceived Paralympians as unhappier than Olympians, inferring that they must be so because of Paralympians' physical disabilities and/or because they perceived Paralympian competitions to be less prestigious than Olympian competitions.

Teams were rated as happier than individuals. But can we know if 'a trouble shared is a trouble halved' or whether 'misery loves company'? The results further show that teams who win silver are less happy than individuals who win silver, suggesting that 'troubles' shared (troubles in the form of missing out on a gold) are not 'troubles' halved. Happiness appears to love company, however, in the Paralympics. Gold and bronze team Paralympians were happier than gold and bronze individual Paralympians, respectively. Olympians do not appear to enjoy sharing their victories, though, as gold and bronze team Olympians were less happy than gold and bronze individual Olympians. Our evidence is thus largely consistent with the theory that emotions spread among social networks (Fowler & Christakis, 2008) except among Olympian gold and bronze medallists, who are happiest when competing alone. It is possible, however, that self-selection effects also affect the relative happiness of team and individual athletes. Extraverts are happier than introverts and are better at building social networks (De Neve & Cooper, 1999; Smillie et al., 2015; Duffy & Chartrand, 2015), so team athletes may have been more sensitive to others' emotions prior to becoming members of an athletic team. Raters may also perceive groups as being happier overall than individuals because groups confer social support.

In contrast to our expectations, raters who were dissimilar to athletes on observable characteristics, such as ethnicity and gender, perceived athletes as happier. Even though prior research suggests that similarity increases trustworthiness (e.g., Durantini et al., 2006), and that trustworthiness increases perceived happiness (Oosterhof & Todorov, 2008), there does not appear to be a direct link between raters' similarity and the perceived happiness of others in our study. Given previous evidence suggesting that emotions can be more accurately recognised amongst individuals sharing the same culture (Elfenbein & Ambady, 2002; Elfenbein et al., 2007), it may be that similar raters are not 'fooled' by the smiles of athletes on the podium and are better able to detect nuances in emotional expression, which depresses their assessments of athletes' happiness. Raters, however, do not appear to be 'fooled' by their own feelings; happier raters did not rate athletes as being much happier.

Critically, the findings of this study rely on the validity of informer ratings of happiness. Facial expressions can indeed proxy peoples' emotions (Izard, 1971; Sandvik et al., 1993; Lepper, 1998) and, as already noted, such ratings have been used in past research within this field of enquiry. Yet, the convergence of these ratings to the self-reported happiness of the people being rated is not perfect (Schneider & Schimmack, 2009). The degree to which such ratings are sufficiently valid for the case of groups of people—as in team athletes which we partly examine here—is an area that future research should consider. It is not clear, for example, whether in reporting how happy they perceive the group to be, raters look for—and hence focus their attention on—the person perceived to be the happiest within the group.

Future research should seek to replicate these hypotheses and findings, but also expand our knowledge by considering additional avenues of research. For example, it may be

argued that comparisons are more salient at the time during which they actually receive their medal whilst at the podium, rather than the time at which they take their first step on the podium as investigated in our study. Our findings also offer limited insight about the impact of relative success following the awards ceremony, and generally following the Olympic Games, during which relative comparisons might fade away and athletes reflect on their actual category achieved (i.e., objective success). Thus, silver medallists might consistently be happier than bronze medallists over time. Future research could explore this possibility by surveying medallists over time following their award. Marginal category-based counterfactual thoughts and their relation to actual medal rankings and happiness could be further studied in combination with athletes' own expectations rather than those based on sports-related sources, such as magazines (McGraw et al., 2005).

This is all for the future, and, as with most things in life, context matters. In the context of sports competitions, there is little doubt that you will be happiest if you win. But if you cannot win, then our study suggests that you might feel better by taking your foot off the gas and coming in second by quite a margin; and, perhaps, even coming in third.

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Appendix

Table A1: Descriptive statistics related to footage

Type of Sport	%	*Size of Team*	%
Athletics	24.78	0	85.84
Boxing	3.54	1	0.01
Canoeing	2.65	2	9.73
Cycling	14.16	3	0.89
Diving	0.88	4	2.65
Equestrian	1.77	16	0.88
Gymnastics	0.88		
Hockey	0.88		
Judo	1.77		
Pentathlon	0.88		
Powerlifting	0.88		
Rowing	5.31		
Sailing	0.88		
Shooting	0.88		
Swimming	32.74		
Table Tennis	2.65		
Taekwondo	0.88		
Tennis	0.88		
Triathlon	1.77		
Wheelchair Tennis	0.88		

Table A2: Athlete footage included in study

Olympic Athlete(s)	Medal	Event	Paralympic Athlete(s)	Medal	Event
H Glover, H Stanning	Gold	Rowing	E Simmonds	Gold	Swimming
B Wiggins	Gold	Cycling	E Simmonds	Gold	Swimming
P Wilson	Gold	Shooting	J Craig	Gold	Swimming
S Burke, E Clancy, P Kennaugh, G Thomas	Gold	Cycling	H Frederiksen	Gold	Swimming
V Pendleton	Gold	Cycling	M Colbourne	Gold	Cycling
A Gregory, T James, P Reed, A Triggs-Hodge	Gold	Rowing	N Fachie, B Storey	Gold	Cycling
K Copeland, S Hosking	Gold	Rowing	J-J Applegate	Gold	Swimming
D King, J Rowsell, L Trott	Gold	Cycling	J Fox	Gold	Swimming
J Ennis	Gold	Athletics	S Storey	Gold	Cycling
G Rutherford	Gold	Athletics	H Cockroft	Gold	Athletics
M Farah	Gold	Athletics	R Whitehead	Gold	Athletics
S Brash, P Charles, B Maher, N Skelton	Gold	Equestrian	A Davies	Gold	Athletics
A Brownlee	Gold	Triathlon	D Weir	Gold	Athletics
L Trott	Gold	Cycling	S Storey	Gold	Cycling
C Dujardin	Gold	Equestrian	O Hynd	Gold	Swimming
N Adams	Gold	Boxing	H Lucas	Gold	Sailing
J Jones	Gold	Taekwondo	H Cockroft	Gold	Athletics
E McKeever	Gold	Canoeing	D Weir	Gold	Athletics
M Farah	Gold	Athletics	J Peacock	Gold	Athletics
L Campbell	Gold	Boxing	J Pearson	Gold	Athletics
A Joshua	Gold	Boxing	D Weir	Gold	Athletics
M Jamieson	Silver	Swimming	C Henshaw	Silver	Swimming
D Florence, R Hounslow	Silver	Canoeing	C Cashmore	Silver	Swimming
M Hunter, Z Purchase	Silver	Rowing	H Russell	Silver	Swimming
A Murray, L Robson	Silver	Tennis	A Moores	Silver	Swimming
C Ohuruogu	Silver	Athletics	S Kindred	Silver	Swimming
V Pendleton	Silver	Cycling	S Millward	Silver	Swimming
F Evans	Silver	Boxing	H Frederiksen	Silver	Swimming
S Murray	Silver	Pentathlon	L Watkin	Silver	Swimming
G Nash, W Satch	Bronze	Rowing	N Kindred	Silver	Swimming
A Campbell	Bronze	Rowing	S Millward	Silver	Swimming
R Adlington	Bronze	Swimming	E Simmonds	Silver	Swimming
M Whitlock	Bronze	Gymnastics	M Colbourne	Silver	Cycling
E Clancy	Bronze	Cycling	A McGlynn, H Scott	Silver	Cycling
J Brownlee	Bronze	Triathlon	J-A Butterworth	Silver	Cycling
R Grabarz	Bronze	Athletics	S McKeown	Silver	Cycling
T Daley	Bronze	Diving	S Ingram	Silver	Judo
L Heath, J Schofield	Bronze	Canoeing	J Crisp	Silver	Swimming
B Storry, E Maguire, L Unsworth, C Cullen,	Bronze	Hockey	O Hynd	Silver	Swimming
A Panter, H Macleod, H Richardson, K Walsh,			S Reid	Silver	Athletics
C Rogers, L Bartlett, A Danson, G Twigg, A Ball,			W Bayley	Silver	Table tennis
S Walton, N White, S Thomas			G Ballard	Silver	Athletics
			S Millward	Silver	Swimming
			P Blake	Silver	Athletics
			H Frederiksen	Silver	Swimming
			D Greaves	Silver	Athletics
			H Russell	Bronze	Swimming
			E Johnson	Bronze	Swimming
			R Welbourn	Bronze	Swimming
			M Whorwood	Bronze	Swimming
			N Jones	Bronze	Swimming
			S Rodgers	Bronze	Swimming
			S Rodgers	Bronze	Swimming
			J Clegg	Bronze	Swimming
			M Walker	Bronze	Swimming
			E Simmonds	Bronze	Swimming
			B Quilter	Bronze	Judo
			Z Newson	Bronze	Powerlifting
			A Davies	Bronze	Athletics
			G Prescott	Bronze	Athletics
			R Womack	Bronze	Athletics
			C Williams	Bronze	Athletics
			J Cundy	Bronze	Cycling
			P Davies	Bronze	Table tennis
			O Hynd	Bronze	Swimming
			D Devine	Bronze	Athletics
			B Jones	Bronze	Athletics
			L Watkin	Bronze	Swimming
			B Rushgrove	Bronze	Athletics
			P Blake	Bronze	Athletics
			O Abidogun	Bronze	Athletics
			L Shuker, J Whiley	Bronze	Wheelchair tennis
			J Campbell, S Head	Bronze	Table tennis
			H Lee	Bronze	Swimming

Table A3: Coding according to the relative size of the difference within events between athletes

Code	*Margin by which won medal*
1	The difference between gold and silver is the largest difference, the difference between silver and bronze is the second largest difference, and the difference between bronze and fourth place is the smallest difference
2	The difference between gold and silver is the largest difference, the difference between silver and bronze is the smallest difference, and the difference between bronze and fourth place is the second largest difference
3	The difference between gold and silver is the second largest difference, the difference between silver and bronze is the largest difference, and the difference between bronze and fourth place is the smallest difference
4	The difference between gold and silver is the second largest difference, the difference between sliver and bronze is the smallest difference, the difference between bronze and fourth place is the largest difference
5	The difference between gold and silver is the smallest difference, the difference between silver and bronze is the second largest difference, and the difference between bronze and fourth place is the largest difference
6	Difference between gold and silver is the smallest difference, the difference between silver and bronze is the largest difference, and the difference between bronze and fourth place is the second largest difference

Table A4: Differences among individuals/teams in the Olympics/Paralympics

	Olympics				Paralympics			
	Individual		Team		Individual		Team	
	b	se	b	se	b	se	b	se
Medal (Ref=Silver)								
Gold	0.26***	0.06	1.13***	0.08	0.42***	0.03	2.67***	0.12
Bronze	-0.39***	0.07	0.51***	0.09	0.09**	0.03	1.73***	0.11
Constant	6.84***	0.06	5.69***	0.08	5.80***	0.04	5.06***	0.08
R^2	0.02		0.05		0.01		0.23	
$N_{ratings}$	8381		3744		21794		1229	

Notes: Difference in happiness ratings of gold and bronze medal winners vs. silver medal winners. Standard errors clustered at the rater level. *** $p < 0.001$, ** $p < 0.01$

Table A5: Differences according to ethnic/gender similarity between athletes & raters

	Ethnic				Gender			
	Similarity		Dissimilarity		Similarity		Dissimilarity	
	b	se	b	se	b	se	b	se
Medal (Ref=Silver)								
Gold	0.62***	0.03	0.79***	0.05	0.59***	0.04	0.63***	0.04
Bronze	0.09***	0.03	0.29***	0.05	0.15***	0.04	-0.08**	0.04
Constant	5.85***	0.05	6.02***	0.07	5.82***	0.05	6.12***	0.05
R^2	0.02		0.02		0.01		0.03	
$N_{ratings}$	18095		8325		14395		13119	

Notes: Difference in happiness ratings of gold and bronze medal winners vs. silver medal winners. Standard errors clustered at the rater level. *** $p < 0.001$, ** $p < 0.01$

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