

Why do professional athletes have different time preferences than non-athletes?

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Abstract

The objective of this paper is to measure and compare the subjective time discounting of professional athletes and non-athletes. By using a questionnaire, we found higher subjective discounting for professional athletes than for non-athletes. We also found that the professional athletes' win-orientation positively affected their present preferences. On the other hand, professional athletes' play-orientation, which reflects their attitude towards the game itself, negatively affected their present preferences. No such effects were found in non-athletes. We argue that the "win-at-all-costs" competitive approach that leads athletes to sacrifice everything in order to win may cause (or reflect) their higher preference for the present.

Keywords: discounting, risk aversion, sports, athletes, play orientation, win orientation, time preference.

1 Introduction

The subjective time discount rate is measured by the rate between the amount individual is willing to receive in the future, instead of a given amount in the present. This rate decreases with one's willingness to wait, meaning higher rate for an individual who is less patient and more biased to the present. The literature on time subjective discounting is extensive. It is related to psychological characteristics and cultural and demographic differences (e.g., Wright et al., 1983; Yates & Lee, 1995; Du et al., 2002; Sozou & Seymour, 2003; Read & Read, 2004; Mahajna et al., 2008; Rosenboim et al., 2010).

The socio-emotional selectivity theory suggests that the perception of time plays a fundamental role in the selection and pursuit of social goals. Carstensen et al. (1999) developed this theory and suggest, "When the conclusion of the appraisal process is that time is limited, the acquisitive mode associated with unlimited time is transformed into a more present-oriented state. Present orientation is likely to involve goals related to feeling states, deriving emotional meaning, and experiencing emotional satisfaction" (p. 167).

In the current paper, we compare time preference of professional athletes to non-athletes. The participants in this research were 74 professional Israeli athletes and 70 non-athletes. The group of professional athletes included

Olympic medalists, medalists from the European and World Championships and members of national teams and national champions. The comparison of the psychological characteristics of athletes and non-athletes is one of the most frequently explored topics in personality studies related to sports. In the attempt to determine whether athletes differ from non-athletes, many researchers have looked at psychological, personality and perceptual-style variables. To the best of our knowledge, there are no studies that analyze professional athletes' time preference. McCann (2006) analyzed decision-making among professional athletes considering contract offers. Specifically, he examined why some professional athletes pursue the most lucrative offer, while others do not, and to what extent cognitive biases and heuristics influence their decision-making. He suggests that the lack of studies on influence of behavioral tendencies on professional athletes is not surprising, "Given the relative paucity of professional athletes among the general population, their presumptively unique modes of employment, and a general aversion among academics to the study of sports" (p. 1461). However, he suggests that "unlike other population groups professional athletes spontaneously furnish publishable commentary of their values, beliefs, and priorities, and they do so in real world, rather than experimental settings. Indeed, by escaping the alleged 'experimental flaw' of many behavioral law and economic studies, professional athletes offer a uniquely appealing group for further examination. For that reason, recognition of how professional athletes respond to subjective stimuli, as well as cognitive distortions, may reveal as much about us as it does about them" (p. 1528).

We suggest that the group of professional athletes is unique due to its "win-at-all-costs" competitive approach

We would like to thank Yoav Bruck, Alex Averbuch, Tomer Cohen, Alex Gilman, Alexander Uvarov, Dor Blech, Bruria Bigman, Leonid Kaufman, Lior Hashai, Noa Rekanati, Eran Vardi, Gil Lev, Shlomi Peer and Dr Yotam Luria for their assistance.

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(Gill & Deeter, 1988; Vallerand & Losier, 1994). This competitive approach leads athletes to concentrate more on the present and sometimes sacrifice their future. In the next section, we discuss how the win-at-all-costs approach affects professional athletes' time preference and subjective discount rate.

2 Professional athletes, "Win-at-all-costs" and time preference.

The win-at-all-costs approach is well-documented in the literature of sports psychology. Vallerand and Losier (1994) suggest, "Playing to win at all costs may lead an athlete to cheat in order to reach his or her goal" (p. 230). Furthermore, studies have shown that athletes point to their coach as having a heavy influence on their decisions to win-at-all-costs (Guivernau & Duda, 2002; Stephens & Bredemeier, 1996). The win-at-all-costs approach may lead athletes to sacrifice all for the cause (Rudd & Mondello, 2006). The Canadian Sport for Life movement, which tries to improve the quality of sports and physical activity in Canada, published a 7-stage Canadian model of Long-Term Athlete Development (LTAD). They argue, "Athletes' environment is geared to the short-term outcome—winning—and not to the process, and as an outcome there are bad habits developed from over competition focused on winning" (p. 17).

Indeed, professional athletes will endanger their health and sometimes their future by competing when injured¹. Some professional athletes are willing to use drugs in order to improve their performance and increase their chance of winning. Using drugs puts the athlete's health and future reputation at risk². In 1999, the Department of Industry, Science and Resources in Australia published a report on professional sports in Australia. The report mentions the common use of drugs in professional sports and the Australia's anti-drugs in sport programs. The report claims, "The pressures of international sport create an environment for taking drugs, either for performance enhancement or to assist recovery so that high levels of performance can continue" (p. 83).

¹One of the most famous examples is Michael Jordan's "Flu Game" in 1997 when he played with high fever in the game number five of the NBA finals. In 2011, Dirk Nowitzki did the same while playing game number four of the NBA finals. During World Cup in South Africa, Didier Drogba from the Ivory Coast played with a cast to protect his fractured arm.

²Unfortunately, there are many examples, including Canadian athlete Ben Johnson who tested positive after winning in 1988 summer Olympic Games. Marion Jones won five medals at the 2000 summer Olympics but has since agreed to forfeit all medals and prizes dating back to September 2000 after admitting that she took performance-enhancing drugs. Floyd Landis, winner of the 2006 Tour de France was stripped of his title and banned from cycling for two years.

Some studies show that elite performers are so focused on establishing and prolonging their careers at the top that they abandon their higher education (DeBrock et al., 1996; Hickey & Kelly, 2008). Higher education is a means for managing a variety of risks associated with performing at elite levels and very important to life after the career in sports. However, professional athletes are focused more on their athletic achievements in the present than on their future career. This issue became critical to the U.S. Congress, which passed the Right to Know Act in 1990. This act focuses on the low graduation rate of athletes in college athletic programs and was designed to pressure schools to devote more resources in the academic aspects of their athletic programs.

One of the factors that motivates professional athletes to win-at-all-costs is their short career. Ogilvie and Howe (1986) claimed that the typical career length of the peak performance of a professional football, basketball, and baseball player is only 4–5 years. Ogilvie and Taylor (1993) listed three factors that may trigger retirement from professional sports: (1) chronological age or more specifically, the decline in performance due to advancing age, (2) de-selection, and (3) the effects of injury. Any of these could precipitate the athlete's exit from sports. Allison and Meyer (1988) found that the average length of a woman's professional tennis career is 7.5 years. DeBrock et al. (1996) claimed that the median career lengths based on estimates from survival models for the NBA and NFL are 7.9 years and 6.4 years, respectively. Mihovilovic (1968) found that 7% of professional Yugoslavian soccer players retired because they were forced out by younger players. Professional athletes are aware to the fact that their professional career is short and if there is an opportunity to win a competition (regardless of cost) there is no guarantee that this opportunity will occur in the future.

The win-at-all-costs approach also depends on the self-determined motivational profile. Some theories focus on goals and process direct behavior toward desired outcomes (e.g., Ames, 1992; Bandura, 1986; Eccles, 1993). The self-determination theory views motivation in terms of varying degrees of self-determination, leading to a continuum of different types of motivation (Deci & Ryan, 1985; Deci et al., 1991; Rigby et al., 1992). One outcome of the self-determination theory in sport is the sportsmanship orientation. Webb (1969) suggest that individuals adopting a "play"-orientation display positive attitudes towards involvement in sports, relative to those who favor a "professional" (or win-at-all-costs) orientation. Vallerand and Losier (1994) suggest, "Athletes who display a self-determined motivational profile (i.e., who play for fun and for the activity itself) should be more likely to show respect for others and less likely to cheat than athletes who want to win trophies and medals at all costs (a non-self-determined motivational profile)" (p. 235).

The win-at-all-costs competitive approach divides professional athletes from the average population. Since the 1970s, many studies have been written comparing athletes and non-athletes (e.g., Butt, 1976; Maresh et al., 1991; Morgan & Costill, 1996; Dobosz & Beaty, 1999; Han et al. 2006). Filho et al. (2005) found significant differences in eight out of the 12 FPI instrument variables³, such as inhibition, irritability, aggressiveness, fatigability, physical complaints, health concerns, frankness and emotionality between high-level Brazilian athletes and non-athletes, indicating that athletes have differentiated psychological characteristics. Most of these studies compared the psychological characters of professional athletes and non-athletes. None of these studies compared behavioral decision making of professional athletes and non-athletes. Specifically, we did not find even one study that analyzes professional athletes' time preference and compares it to non-athletes, although professional athletes seem biased to the present due to the win-at-all-costs approach, as mentioned before.

Time discounting reflects the marginal rate of substitution between current and future consumption. Studies of decision makers with a time discounting bias indicate that their decisions show a strong preference for the present at the expense of the future (Benzion et al., 1989; Read, 2001; Rubinstein, 2003; Thaler, 1981). Some studies found that the environment in which the individual lives may affect his or her time preferences. For example, Chao et al. (2009) found that both physical health and subjective expectation of survival are related to subjective time discount. Their research was done in South Africa where, due to HIV/AIDS, the middle-age mortality rate is much higher than in developed countries such as the UK, Denmark or the US. Lahav et al. (2011) found that soldiers show a relatively high subjective discount rate when compared to non-soldiers. They suggest that the higher subjective discount rate among soldiers could be the result of high perceived risk in the army or a higher mortality risk. There are some results that suggest that discounting is also somewhat situation specific. Tsukayama and Duckworth (2010) found that adults discounted delayed rewards they found particularly tempting (defined as the visceral attraction to and enjoyment of the reward) more steeply than did adults who did not find the rewards as tempting.

We argue that professional athletes are biased to the present due to the win-at-all-costs approach. Since professional athletes live in a competitive environment that pushes them towards winning regardless of cost, they sacrifice their future (health, education and even reputation,

³The instrument used was the reviewed version of the Freiburg Personality Inventory (FPI-R) containing 138 questions with response possibilities ranging from "I Agree" to "I Do not Agree", being applied just once.

if they use drugs) to achieve their present goal. As a result, we expect to find a higher subjective discount rate for professional athletes compared to non-athletes. However, as mentioned above, the win-at-all-costs approach can be complex since it depends on the self-determined motivational profile. The win-orientation leads athletes to win-at-all-costs; on the other hand, play-orientation leads them to enjoy the sport and play not only for winning.

To measure subjective time discounting, participants were asked to state the amount they would be willing to pay in order to postpone a payment, and the amount they would be willing to accept in order to postpone the receipt of a payment. To control our data we also measured win-orientation, play-orientation and risk-seeking for each group.

3 Method

The study compared 74 professional Israeli athletes (48 men, 26 women, average age, 25.95) from all types of sports to 70 non-athletes (51 men, 19 women, average age, 26.78)⁴. Among the athletes there are two Olympic medalists, 19 members of the national Olympic team in the Beijing and Athens Olympic Games, medalists from the European and World Championships, members of the Davis Cup and Federation Cup tennis teams, national champions in individual of sports, members of the women's national volleyball and basketball teams and basketball, handball and soccer players from the Premier League. Participants were asked to complete a questionnaire that included a number of demographic questions, such as age, gender and education. The second section included the following parts:⁵

Time preference: In the first part, the participants were asked to state the amount of money they would be willing to pay in order to postpone a payment, and the amount of money they would be willing to accept in order to postpone the receipt of a payment (matching task). The two most common experimental procedures used to elicit time preference are choice and matching tasks. In choice tasks, subjects are asked to choose between a smaller, more immediate reward and a larger more delayed reward. In matching tasks subjects are asked for their future reward which is equal to current reward. There is an ambiguity regarding the preferred procedure (see Frederick et al., 2002 for discussion). We chose to use a matching task especially because an exact discount rate can be im-

⁴The average age in the two groups is not significantly different ($t(141)=1.27, p=.21$) and the proportion of men is not significantly different ($Z=0.99, p=0.32$).

⁵There was also a part that measured how much a participant suffers from loss. However, this measure was not relevant to our results since we are interested here in play-orientation and win-orientation, rather than the feeling of loss.

Table 1: The time discounting scenarios.

Amount	Postpone action	Period
1,000	Receipt	1 month
1,000	Receipt	6 months
1,000	Receipt	24 months
1,000	Payment	1 month
1,000	Payment	6 months
1,000	Payment	24 months

puted from a single response, which helps us understand what influences the subjective discount rate (for example, by using a regression analysis below).

We asked only hypothetical questions without offering real monetary incentives.⁶ This might raise the concern that the participants may not be motivated to give thoughtful answers. However, hypothetical questions have some advantages in the domain of time preferences because they allow asking questions involving a long time span and large payoffs (Frederick et al., 2002). There is also evidence that there is no systematic difference when comparing the use of real and hypothetical rewards in time preference experiments (Johnson & Bickel, 2002).

Table 1 presents the six scenarios presented to the subjects.

Following are examples of the questions presented to the participants:

Receipt: An amount of NIS 1,000 is going to be deposited in your bank account immediately. However, we are offering you the option of postponing this deposit and receiving another amount in six months. What is the minimum amount you are willing to accept six months from now in order to postpone receipt of the sum?

Payment: You must pay NIS 1,000 immediately. However, we are offering you the option of postponing the payment and paying another amount in six months. What is the maximum amount you are willing to pay six months from now in order to delay the payment?

The discounting rate for delaying receipt and delaying payment was calculated by the following equation:

$$r = \frac{\frac{P}{X} - 1}{t} \quad (1)$$

⁶Many studies have used hypothetical questions in time preferences surveys (e.g., Ben Zion, et al. 1989; Loewenstein, 1987; Tsukayama & Duckworth, 2010). For general discussion see Frederick et al. (2002).

where P is the payment for delaying the amount of X for t periods.

Risk seeking: We used 12 questions to measure risk seeking (see the Appendix); six about investment decisions (based on Warneryd, 1996) and another six questions designed to measure participants' attitudes toward general risk based on self-perceptions.⁷ All the questions were to be answered on a 7-point scale (1—do not agree, 7—agree). Since subjective time discount was measured in monetary values it was important to measure risk-seeking also in investment decisions.

The measure of attitude toward risk in this part was the average answer for the 12 questions (For some, the scores were reversed). A higher average indicated a more positive attitude toward risk taking.

Win-orientation and play-orientation: This part of the questionnaire was designed to measure participants' win-orientation and play-orientation. Participants were asked to answer eight statements graded on a 7-point scale (1—do not agree, 7—agree) based on Houston et al. (2002). In our analysis, we used only the seven questions that are directly indicative of play-orientation or win-orientation.

The relevant statements were:

(a) *For play-orientation:*

(1) I enjoy being in competition with others in my work.

(2) I enjoy being in competition with others outside of my work.

(3) I try to make a greater effort when I compete with others at work.

(4) I try to make a greater effort when I compete with others outside of work.

(b) *For win-orientation*

(1) If I perform a task outside of my work, it is important to me to be first when competing with others.

(2) I feel that winning is important in games.

(3) I consider the possibility of not losing in any aspect of my life.

The measure of play-orientation was the average answer to the four statements, with a higher average meaning a higher level of play-orientation. The measure of win-orientation was the average answer to the three statements, where a higher average meant a higher level of win-orientation.

⁷Measuring risk attitude in sports specifically is important but only relevant to athletes. Since we wanted to compare athletes to non-athletes we used general risk attitude and financial risk attitude.

Table 2: Average time discounting (STDV) for athletes and non-athletes.

Amount (NIS)	Postpone action	Period	Athletes	Non-athletes	Two-tailed t-test	Cohen's d
1,000	Receipt	1 month	42.9% (58.7%)	22.4% (25.3%)	t(142)=2.75 p=.01	0.454
1,000	Receipt	6 months	28.1% (27.7%)	17.8% (19.4%)	t(142)=2.59 p=.01	0.430
1,000	Receipt	24 months	23.2% (24.2%)	12.9% (14.5%)	t(142)=3.13 p=.00	0.518
1,000	Payment	1 month	20.8% (49.4%)	4.2% (7.6%)	t(142)=2.85 p=.01	0.468
1,000	Payment	6 months	11.9% (21.5%)	3.1% (4.3%)	t(142)=3.44 p=.00	0.566
1,000	Payment	24 months	10.5% (26.8%)	2.6% (3.4%)	t(142)=2.53 p=.01	0.416

4 Results

4.1 Time discounting

Table 2 presents the average subjective monthly discounting rates for athletes and non-athletes in each of the scenarios (standard deviation in brackets). We used equation (1) to calculate the subjective monthly time discount rate.

In all of the cases, we see that the athletes discount time more heavily than non-athletes, indicating that athletes were less willing to postpone receipt or payment than non-athletes. The Cohen's *d* is higher than 0.4, a medium-sized effect. In general, an individual who values the present more than the future will have a higher personal discount rate than a person who places more value on the future. Our results indicate that athletes value the present more than non-athletes. This result is consistent with the win-at-all-costs, competitive approach.

A number of studies have found that people with more financial knowledge tend to exhibit a higher preference for financial risk (Shelbecker, Roszkowski, & Culter, 1990; Cutler, 1995; Grable & Joo, 2004; Rosenboim et al. 2010). In our study there was no difference in general education between the two groups: 57.5% and 47.1% of the athletes and non-athletes respectively received only a high school education ($Z=1.07$, $p=0.28$),⁸ while 35.6% and 42.9% of the athletes and non-athletes, respectively received an academic education ($Z=0.72$, $p=0.47$)⁹. Using an ANOVA with repeated-measure, we find no significant difference in the levels of annual subjective discount rate between athletes with academic education and athletes with a high school education ($F(1,66)=0.24$, $p=0.63$) and between non-athletes with an academic education and non-athletes with high school education ($F(1,61)=1.20$, $p=0.28$). This means that education has no effect on the participants' time preference in both groups.

⁸Note that we did not ask the participants about their financial knowledge. However, education gives us some indication of the participants' intelligence and knowledge.

⁹There were few subjects in each group with a vocational education.

4.2 Play and win-orientations

As mentioned above, we used some of the questions to build play- and win-orientation measures. The average answer to the four questions on play-orientation were used as the measure of play-orientation (*Cronbach's* $\alpha=0.756$). The average measure for athletes is 5.10 (SD=0.95, Med=5.25, Min=2.00, Max=7.00) and for non-athletes is 4.27 (SD=1.27, Med=4.38, Min=1.00, Max=7.00). Athletes show a higher level of this measure than non-athletes ($t(142)=4.45$, $p=.00$).

The average answer to the three questions on win-orientation used as the measure of win-orientation (*Cronbach's* $\alpha = 0.668$). The average measure for athletes is 4.88 (SD=1.23, Med=5.00, Min=2.33, Max=7.00) and for non-athletes is 4.16 (SD=1.21, Med=4.17, Min=1.67, Max=7.00). Athletes show a higher level of this measure than non-athletes ($t(142)=3.54$, $p=.00$). It seems that athletes show higher win-orientation but also higher play-orientation. The win-orientation measure and the play-orientation measure are highly correlated among both athletes (correlation=0.495, $p=0.00$) and non-athletes (correlation=0.498, $p=0.00$).

Next we conducted a multivariate regression analysis of subjective discount rate on time variable (1 month, 6 months or 24 months), dummy variable for receipt or payment (Receipt=1, Payment=0), play orientation measure and win-orientation measure. The regressions were calculated for each group separately. Table 3 presents the regression analysis results.

In both groups, we find that time has negative effect on the annual subjective discount rates, and the subjective discount rates for delaying receipt are higher than those for delaying payments, which is consistent with the literature (e.g., Thaler, 1981; Benzion et al., 1989; and Frederick et al., 2002 for general discussion). Comparing the regression analysis of the two groups, we see that play-orientation has a negative effect on subjective time discount and win-orientation has a positive effect on subjective time discount but only for athletes. For non-athletes, neither play- nor win-orientations have an

Table 4: Time discounting (STDV) for athletes with high play and high win-orientation.

Amount (NIS)	Postpone action	Period	Play orientation group	Win orientation group
1,000	Receipt	1 month	26.0% (23.3%)	51.5% (58.9%)
1,000	Receipt	6 months	18.6% (16.6%)	35.0% (30.0%)
1,000	Receipt	24 months	15.8% (13.5%)	33.1% (32.9%)
1,000	Payment	1 month	11.1% (13.5%)	34.2% (85.1%)
1,000	Payment	6 months	7.4% (9.6%)	20.0% (36.1%)
1,000	Payment	24 months	5.5% (8.2%)	20.7% (46.7%)

Table 3: Regression analysis. The dependent variable is subjective discount rate. Significance levels are in parentheses.

Independent variable	Athletes	Non-athletes
(Constant)	0.274 (0.01)	0.090 (0.00)
Time	-0.005 (0.00)	-0.002 (0.00)
Receipt	0.170 (0.00)	0.144 (0.00)
Play-orientation	-0.052 (0.02)	-0.005 (0.44)
Win-orientation	0.039 (0.02)	-0.003 (0.67)
R ²	0.082 (0.00)	0.208 (0.00)

effect. This is consistent with the self-determined motivational profile. On one hand their professional orientation leads athletes to win-at-all-costs and as a result to be biased to the present (high subjective discount rate). On the other hand, play-orientation leads them to enjoy the sport and play not only to win, making them less biased to the present (low subjective discount rate). To demonstrate the effects of the win-orientation and play-orientation, we divided the group of athletes into two subgroups and compare them to the non-athletes group. The first group contains athletes whose play-orientation is higher than 5 and higher than their win-orientation (24 subjects). The second group contains athletes whose win-orientation higher than 5 and higher than their play-orientation (22 subjects). Table 4 shows the average discount rate and (STDV) for each sub group.

Using an ANOVA with repeated-measure, we find no significant difference in the annual subjective discount rate levels of non-athletes (Table 2) and athletes with high play-orientation ($F(1,92)=2.43, p=0.12$). This means that athletes with relatively high play-orientation show the same time preference as non-athletes. On the other hand, the subgroup of athletes with high win-orientation show higher levels of annual subjective discount rate than athletes with high play-orientation ($F(1,44)=4.66, p=0.04$) and non-athletes ($F(1,90)=17.65, p=0.00$). This shows

that win-orientation pushes professional athletes towards the present, meaning higher time discounting.

4.3 Subjective discounting for receipt and payment

In both groups, the subjective discount rates for delaying receipt are higher than those for delaying payments. This result is consistent with other studies that show that people usually discount delayed losses less steeply than delayed gains (Benzion et al., 1989; Loewenstein, 1987; Loewenstein & Prelec, 1992; Read, 2004; Thaler, 1981). Loewenstein (1987) described it as a sign effect, suggesting that in daily decision-making people prefer to incur a loss sooner rather than delay it. Loss aversion (Kahneman & Tversky, 1979) is used to explain this asymmetric discounting. People are assumed to encode delay of income as a loss and delay of payment as a gain. Since losses loom larger than gains subjective discount rates for delayed income are larger than for delayed payments.

Table 5 presents the average difference between the subjective monthly discounting rates for receipt and payment scenarios for each group.

Table 5 shows that the receipt-payment difference is not significantly different between the athletes and the non-athletes. This may indicate that the effect of loss aversion on the two groups is not different at least regarding time preference.

4.4 Risk attitude

We measured risk aversion by using the average answer to 12 questions (*Cronbach's* $\alpha = 0.834$). The average risk seeking index for athletes is 3.80 (SD=0.85, Med=3.75, Min=2.00, Max=5.50) and for non-athletes is 3.78 (SD=1.08, Med=3.58, Min=1.67, Max=6.92). There is no significant difference between the two groups ($t(142)=0.18, p=.86$)¹⁰. For neither groups we did find a

¹⁰The results are the same if the measure to financial risk seeking is separated from general risk seeking.

Table 5: Annual subjective discounting receipt-payment difference.

Period	Athletes	Non-athletes	Two-tailed T-test
1 month	22.1% (67.2%)	18.2% (26.1%)	$t(142)=0.47, p=.64$
6 months	16.2% (27.0%)	14.7% (18.8%)	$t(142)=0.38, p=.70$
24 months	12.7% (23.5%)	10.2% (14.4%)	$t(142)=0.73, p=.47$

significant correlation between the risk-seeking measure and win- or play-orientation measure.

This is a very surprising finding, given that a career in sports is quite short and can be even shorter because of a decline in performance due to advancing age, deselection, and the effects of injury. There is also evidence that athletes demonstrated significantly higher risk-taking behaviors than the non-athlete. Nattiv et al. (1997) and Garry and Morrissey (2000), found that college and middle school athletes demonstrated significantly higher risk-taking behaviors than their non-athlete peers. Other studies connect attitudes toward risk to career choice. Saks and Shore (2005) found evidence that wealthier students tend to choose riskier careers, because idiosyncratic risk matters in career choice (unlike in traditional asset pricing models) because career risk is not divisible or tradable. Sapienza et al. (2009) showed that risk aversion predicted career choices after graduation. Individuals with high levels of testosterone and low levels of risk aversion were more likely to choose risky careers in finance.

Our study, which included only elite athletes, found no significant difference in attitudes toward risk. One explanation for our results is that risk taking behavior is domain specific as suggested by Hanoch et al. (2006). They used the Domain-Specific Risk-Taking (DOSPERT) scale (e.g., Weber et al., 2002) to measure risk taking behavior in different domains (recreational, health, social, ethical, gambling and investment domains). They show that individuals who exhibit high levels of risk-taking behavior in one content area (e.g., bungee jumpers taking recreational risks) can exhibit moderate levels in other risky domains (e.g., financial). Athletes could take more risks in their professional career but show less risk-taking behavior in other domains (such as finance) than non-athletes.

Another possible explanation is the sense of harm avoidance detected by Han et al. (2006) in a group of athletes. Harm avoidance refers to individuals (athletes) who are cautious, fearful, inhibited and apprehensive (Cloninger, 1986). This harm avoidance reduces the athletes' risk taking and may overcome the uncertainty about his future.

4.5 Team sports and individual sports

Some studies of the psychological characteristics of athletes compared athletes from team sports and those from individual sports. Hanson (1967) found that those who participate in individual sports, where individual performance is naturally evaluated more than in team sports, exhibited greater stress prior to competitions. Vealey (1988) found that team athletes were more confident than individual sports athletes. O'Sullivan et al. (1998) found that athletes in team sports had higher activity and lower neuroticism-anxiety levels than the general college population. Backmand et al. (2001) compared different groups of athletes with non-athletes. They found that athletes in individual power sports were more introverted than other groups. Nicholls et al. (2009) found no significant relationship between mental toughness and the type of sport (team or individual) in which an athlete participated.

In order to examine the effect of being a member of an athletic team as opposed to playing an individual sport, we compared 44 athletes in team sports (28 men, 16 women, average age, 26.02) to 30 athletes in individual sports (20 men, 10 women, average age, 25.83).¹¹ Using an ANOVA with repeated-measures, we find no significant difference in the levels of annual subjective discount rate between team athletes and individual athletes ($F(1,72)=0.90, p=0.35$). In addition, we did not find significant differences between the two groups for risk-seeking, play-orientation and win-orientation measures.

5 Discussion

We measured time preference for professional athletes and compared it to non-athletes. We found that professional athletes have a high time preference (focus on the present). We also found a significant difference between the two groups with regard to time discounting. Athletes discount time more heavily than non-athletes, indicating that athletes are less willing to postpone receipt or payment of money than non-athletes. It may also indicate that the ratio between their present consumption to future

¹¹The average age in the two groups is not significantly different ($t(72)=0.18, p=.86$) and the proportion of men is not significantly different ($Z=0.02, p=0.98$).

consumption is too high. In the present study, we endeavored to find reasons for this.

It seems that athletes' time preference is affected by their sports orientation. Play-orientation affects subjective time discounting negatively while win-orientation affects subjective time discounting positively. These results are expected since a win-orientation leads athletes to win-at-all-costs and sacrifice their future.

Our findings show a difference in discounting between athletes and non-athletes in the domain of finance, which seems different from the domain of sports. The win-at-all-costs approach is not specifically part of the money domain but a way of life for professional athletes. However, it does seem that the win-at-all-costs approach, or some more general trait behind it, also affects the professional athletes' discounting in the financial domain. One possible explanation is that most people are working hard in the present to improve their future. People study, save money and work to have better life in the future. However, professional athletes are actually having a different life than other people. They are working hard in the present but the fruit of their investment is also in the present. They earn records and other rewards for their hard work in the present and have a short time to take the advantage of their peak career. This means that professional athletes are like borrowers who gain today but pay in the future, while non-athletes are mostly like savers who invest today and gain in the future.

From the results of this paper, we cannot say if athletes chose an athletic career because of their character or if sports lead them to have higher play- and win-orientations than non-athletes. The different time preference between athletes and non-athletes could be antecedents of their occupational choices or consequences.¹² However, as mentioned before, there is evidence that athletes indicate that their coach has a major influence on their decision to win-at-all-cost (Guivernau & Duda 2002; Stephens & Bredemeier, 1996). This may indicate that the high subjective time discounting of athletes is caused by a mix of occupational choices and consequences. Simply put, it may be that those who choose a professional sports career are more biased to the present (due to win-at-all-costs approach), but it is the environment that pushes them forward and increase their will to win-at-all-costs. To minimize this phenomenon, some countries such as Canada and Australia have established sports pacts.

¹²To better understand this mix one should examine professional athletes in the early stage of their career (probability when they are very young). At these ages, it could be found that younger, "professional" athletes have lower discount rate than young non-athletes. At this stage, we leave this to future research.

References

- Allison, M. T., & Meyer, C. (1988). Career problems and retirement among elite athletes: The female tennis professional. *Sociology of Sport Journal*, 5, 212–222.
- Ames, C. (1992). Achievement goals, motivational climate, and motivational processes. In G. C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 161–176). Champaign, IL: Human Kinetics.
- Backmand, H., Kaprio, J., Kujala, U., & Sarna, S. (2001). Personality and mood of former elite male athletes: A descriptive study. *International Journal of Sports Medicine*, 22, 215–221.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Benzion, U., Rapoport, A., & Yagil, J. (1989). Discount rates inferred from decisions: An experimental study. *Management Science*, 35, 270–284.
- Butt, D. S. (1976). *Psychology of sport: The behavior, motivation, personality, and performance of athletes*. New York: Van Nostrand Reinhold Co.
- Canadian Sport for Life. Long-Term Athlete Development, Resource Paper, Vol. 2. (http://www.sasksport.sk.ca/CS4L/pdf/LTAD_ResourcePaper.pdf)
- Carstensen, L. L., Isaacowitz, D. M., & Charles S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychology*, 54, 165–181.
- Chao L. W., Szrek, H., Pereira N. S., & Pauly, M. V. (2009). Time preference and its relationship with age, health, and survival probability. *Judgment and Decision Making*, 4, 1–19.
- Cloninger, C. R. (1986) A systematic method for clinical description and classification of personality variants. *Archives of General Psychiatry*, 44, 573–588.
- Culter, N. E. (1995). Three myths of risk-tolerance: What clients are not telling you. *Journal of the American Society of CLU & ChFC*, 49, 33–37.
- DeBrock, L., Hendricks, W., & Koenker, R. (1996). The economics of persistence: Graduation rates of athletes as labor market choice. *The Journal of Human Resources*, 31, 513–539.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *The Educational Psychologist*, 26, 325–346.
- Department of Industry, Science and Resources. (1999). *Shaping up: A review of Commonwealth involvement in sport and recreation in Australia: A report to the Federal Government*. (<http://www.isr.gov.au/sportpost2000/shapeup.pdf>).

- Dobosz, R., & Beaty, L. (1999). The relationship between athletic participation and high school students' leadership ability. *Adolescence, 34*, 215–220.
- Du, W., Green, L., & Myerson, J. (2002). Cross-cultural comparisons of discounting delayed and probabilistic rewards. *The Psychological Record, 52*, 479–494.
- Eccles, J. S. (1993). School and family effects on the ontogeny of children's interests, self-perceptions, and activity choices. In J. E. Jacobs (Ed.), *Nebraska symposium on motivation 1992: Developmental perspectives on motivation* (Vol. 40, pp. 145–208). Lincoln, NE: University of Nebraska Press.
- Filho, M. G. B., Ribeiro, L. C. S., & Garcia, F. G. (2005). Comparison of personality characteristics between high-level Brazilian athletes and non-athletes. *Revista Brasileira de Medicina do Esporte, 11*, 115–120.
- Frederick S., Loewenstein, G., & O'Donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of Economic Literature, 40*, 351–401.
- Garry, J. P., & Morrissey, S. L. (2000). Team sports participation and risk-taking behaviors among a biracial middle school population. *Clinical Journal of Sport Medicine, 10*, 185–190.
- Gill, D. L., & Deeter, T. E. (1988). Development of the sport orientation questionnaire. *Research Quarterly for Exercise and Sport, 59*, 191–202.
- Grable, J. E., & Joo, S. (2004). Environmental and bio psychosocial factors associated with financial risk tolerance. *Financial Counseling and Planning, 15*, 73–82.
- Guivernau, M., & Duda, J. L. (2002). Moral atmosphere and athletic aggressive tendencies in young soccer players. *Journal of Moral Education, 31*, 67–85.
- Han, D. H., Kim, J. H., Lee, Y. S., Bae, S. J., Bae, S. J., Kim, H. J., Sim, M. Y., Sung, Y. H., & Lyoo, I. K. (2006). Influence of temperament and anxiety on athletic performance. *Journal of Sports Science and Medicine, 5*, 381–89.
- Hanoch, Y., Johnson, J. G., & Wilke, A. (2006). Domain specificity in experimental measures and participant recruitment an application to risk-taking behavior. *Psychological Science, 17*, 300–304.
- Hanson, D. L. (1967) Cardiac response to participation in little league baseball competition as determined by telemetry. *Research Quarterly, 38*, 384–388.
- Hickey, C., & Kelly, P. (2008) Preparing to not be a footballer: higher education and professional sport. *Sport, Education and Society, 13*, 477–494
- Houston, J. M., McIntire, S., Kinnie, J., & Terry, C. (2002). A factor analysis of scales measuring competitiveness. *Educational and Psychological Measurement, 62*, 284–298.
- Johnson, M. W., & Bickel, W. K. (2002). Within-subject comparison of real and hyperthetical money rewards in delay discounting. *Journal of the Experimental Analysis of Behavior, 77*, 129–146.
- Kahneman, D., & Tversky A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*, 263–292.
- Lahav, E; Benzion, U., & Shavit, T. (2011). The effect of military service on soldiers' time preference - Evidence from Israel. *Judgment and Decision-Making, 6*, 130–138.
- Loewenstein, G. (1987). Anticipation and the valuation of delayed consumption. *Economic Journal, 97*, 666–684.
- Loewenstein, G., & Prelec, D. (1992). Anomalies in intertemporal choice: evidence and an interpretation. *Quarterly Journal of Economics, 107*, 573–597.
- Mahajna, A., Benzion, U., Bogaire, R., & Shavit, T. (2008). Subjective discount rates among Israeli Arabs and Israeli Jews. *Journal of Socio Economics, 37*, 2513–2522.
- Maresh, C. M., Sheckley, B. G., Allen, G. J., Carmaione, D. N., & Sinatra, S. T. (1991). Middle age male distances runners: physiological and psychological profiles. *The Journal of Sports Medicine and Physical Fitness, 31*, 461–469.
- McCann, M. A. (2006). It's not about the money: The role of preferences, cognitive biases, and heuristics among professional athletes. *Brooklyn Law Review, 71*, 1459–1528.
- Mihovilovic, M. (1968). The status of former sportsman. *International Review of Sport Sociology, 3*, 73–96.
- Morgan, W. P., & Costill, D. L. (1996). Selected psychological characteristics and health behaviors of aging marathon runners: A longitudinal study. *International Journal of Sports Medicine, 17*, 305–312.
- Nattiv, A., Puffer, J. C., & Green, G. A. (1997). Lifestyles and health risks of collegiate athletes: A multi-center study. *Clinical Journal of Sport Medicine, 7*, 262–272.
- Nicholls, A. R., Polman, R. C. J., Levy, A. R., & Backhouse, S. H. (2009). Mental toughness in sport: Achievement level, gender, age, experience, and sport type differences. *Personality and Individual Differences, 47*, 73–75.
- Ogilvie, B. C., & Howe, M. (1986). The trauma of termination from athletics. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance*, (pp. 365–382). Mountain View, CA: Mayfield Publishing Company.
- Ogilvie, B. C., & Taylor, J. (1993). Career termination issues among elite athletes. In R. N. Singer, M. Murphy, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 761–775). New York: Macmillan.

- O'Sullivan, D., Zuckerman, M., & Kraft, M. (1998). Personality characteristics of male and female participants in team sports. *Personality and Individual Differences*, 25, 119–128.
- Read, D. (2001). Is time-discounting hyperbolic or sub-additive? *Journal of Risk and Uncertainty*, 23, 5–32.
- Read, D., & Read, N. L. (2004). Time discounting over the lifespan. *Organization Behavior and Human Decision Processes*, 94, 22–32.
- Read, D. (2004). Intertemporal choice. In D. Koehler, N. Harvey (Eds.), *Blackwell handbook of judgment and decision making* (pp. 424–443). Oxford: Blackwell.
- Rigby, S. C., Deci, E. L., Patrick, B. C., & Ryan, R. M. (1992). Beyond the intrinsic-extrinsic dichotomy: Self-determination in motivation and learning. *Motivation and Emotion*, 16, 165–185.
- Rosenboim, M., Shavit, T., & Shoham, A. (2010). Financial decision making in collective society: A field test on Israeli kibbutz members and city residents. *The Journal of Socio-Economics*, 39, 30–36.
- Rubinstein, A. (2003). Economics and psychology? The case of hyperbolic discounting. *International Economic Review*, 44, 1207–1216.
- Rudd, A., & Mondello, M. J. (2006). How do college coaches define character? A qualitative study with division I head coaches. *Journal of College & Character*, 3, 1–10.
- Saks, R. E., & Shore, S. H. (2005). Risk and career choice. *Advances in Economic Analysis & Policy*, 5, Article 7.
- Sapienza, P., Zingales, L., & Maestripieri, D. (2009). Gender differences in financial risk aversion and career choices are affected by testosterone. *Proceedings of the National Academy of Science*, 106, 15268–15273.
- Shelbecker, G. E., Roszkowski, M. J., & Culter, N. E. (1990). Investors' risk tolerance and return aspirations, and financial advisor's interpretations: A conceptual model and exploratory data. *Journal of Behavioral Economics* 19, 377–393.
- Stephens, D. E., & Bredemeier, B. J. (1996). Moral atmosphere and judgments about aggression in girls' soccer: relationships among moral and motivational variables. *Journal of Sport & Exercise Psychology*, 18, 158–173.
- Sozou, P. D., Seymour, R. M., 2003. Augmented Discounting: Interaction between Aging and Time-preference Behavior. *Proceedings of the Royal Society of London*, 270, 1047–1053.
- Thaler, R. H. (1981). Some empirical evidence on dynamic inconsistency. *Economics Letters*, 8, 201–207.
- Tsukayama, E., & Duckworth, A. L. (2010). Domain-specific temporal discounting and temptation. *Judgment and Decision Making*, 5, 72–82.
- Vallerand, R. J., & Losier, G. F. (1994). Self-Determined Motivation and Sportsmanship Orientations: An Assessment of Their Temporal Relationship. *Journal of Sport & Exercise psychology*, 16, 229–245.
- Vealey, R. S. (1988). Sport-confidence and competitive orientation: an addendum on scoring procedures and gender differences. *Journal of Sports and Exercise Psychology*, 10, 471–478.
- Warneryd, K. E. (1996). Risk attitude and risky behavior. *Journal of Economic Psychology*, 17, 749–770.
- Webb, H. (1969). Professionalization of attitudes toward play among adolescents. In G. S. Kenyon (Ed.), *Aspects of contemporary sport sociology* (pp. 161–187). Chicago: The Athletic Institute.
- Weber, E. U., Blais, A. R., & Betz, N. E. (2002). A domain-specific risk attitude scale: Measuring risk perceptions and risk behaviors. *Journal of Behavioral Decision Making*, 15, 263–290.
- Wright, G. N., Phillips, L. D., & Wisudha, A. (1983). Cultural comparison on decision making under uncertainty. In J. B. Derogowski, S. Dziurawiec, & R. C. Annis (Eds.), *Expiscations in cross cultural psychology* (pp. 387–402). Lisse, The Netherlands: Swetz & Zeitlingear BV.
- Yates, J. F., & Lee, J. K. (1995). Chinese decision making. In M. H. Bond (Ed.), *Handbook of Chinese psychology*. Hong Kong: Oxford University Press, 1995

Appendix: Risk attitude measure

1. I think that it is more important to invest in a safe investment with a safe return than to take a risk with a chance for a higher or lower return.
2. I will never invest in stocks since they are risky.
3. If I thought that an investment would be profitable, I'd be willing to take out a loan.
4. I always make sure my investment is safe.
5. I am sure I have to take more risks in order to increase my financial state.
6. I am willing to run the risk of a loss if there is a chance to gain.
7. I enjoy taking risks.
8. I avoid situations of uncertainty.
9. I am not troubled by taking risks if my actions might yield substantial gains.
10. I consider the possibility of not taking risks as a main factor in my life.
11. People say that I enjoy taking risks.
12. I will take risks only very occasionally, if at all, if there is another alternative.