Relation between Sport/Exercise Participation and Other Indicators of Healthy Adolescent Development

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There is growing interest in the developmental consequences of extracurricular and after-school programs for youth, fueled, in part, by: (a) concerns about the role such activities might play in promoting school achievement and preventing school disengagement and other problems, (b) the continuing social class and ethic group disparities in the school achievement, (c) concerns about the preparation of American youth for an increasingly demanding and technical labor market, and (d) the amount of unsupervised time experienced by so many youth (Barber et al. 2001; Barber et al., 2004; Eccles & Barber, 1999; Eccles et al., 2003; Eccles & Gootman, 2002; Eccles & Templeton, 2002; Pittman, Tolman & Yohalem, 2005). Children and adolescents in the USA spend more than half of their waking hours in leisure activities (Larson & Verma, 1999). For many, much of this time is spent in either unstructured peer focused activities or in front of the television set. Both developmental scientists and youth policy advocates have suggested that this leisure time could be better spent in ways (such as participating in high quality out-of-school and after-school programs) that would both facilitate positive development and prevent the emergence of developmental problems (Eccles & Gootman, 2002). These scholars and advocates have also noted that the availability of such programs is inequitably distributed across communities in the USA – with much lower availability in precisely those communities where the adolescents are at highest risk for poor developmental outcomes (Mahoney, Larson, & Eccles, in press; Pedersen & Seidman, 2004). Interest in the developmental consequences of extracurricular and after-school programs has also been stimulated by the growing interest in positive psychology and positive youth development. Advocates for positive youth development, in particular, argue that such programs are needed to fully prepare our youth for the transition into adulthood (Eccles & Gootman, 2002; Pittman,

Tolman, & Yohalem, 2004). Again the need for such programs is especially acute for youth living in poor communities.

Developmentalists and youth advocates argue that constructive, organized activities are a good use of the adolescents' time because such activities provide opportunities (a) to acquire and practice specific social, physical and intellectual skills that may be useful in a wide variety of settings including school; (b) to contribute to the well-being of one's community and to develop a sense of agency as a member of one's community; (c) to belong to a socially recognized and valued group; (d) to establish supportive social networks of peers and adults that can help in both the present and the future; and (e) to experience and deal with challenges. In turn, these assets are predicted to facilitate both current levels of school engagement and achievement and subsequent educational and occupational attainment and to prevent the emergence of risky behavior patterns that can mortgage young people's future.

Support for these suggestions comes from both classic sociology studies of the relation of extracurricular activities to school achievement and the newer research in leisure studies, sports psychology, prevention science, and the interdisciplinary studies of adolescent development (see Eccles & Gootman, 2002; Eccles & Templeton, 2002 for full review). Several sociological studies in the 70s documented a strong link between adolescents' extracurricular activities and adult educational attainment, occupation and income, even after controlling for social class and cognitive ability (see Osgood, Anderson, & Shaffer, 2004). Some of these studies also documented a protective association between extracurricular activity participation and involvement in delinquent and other risky behaviors (Landers & Landers, 1978).

More recently, research in both leisure studies and adolescent development provides support for the benefits of participating in the kinds of constructive leisure activities associated

with extracurricular activities and service learning (Larson, 2000; Larson & Kleiber, 1993; Mahoney et al., 2004). For example, Mahoney and his colleagues have documented the link between extended participation in extracurricular activities during high school and reduced rates of school dropout and criminal offending, particularly during the early high school years and for high-risk youth (Mahoney & Cairns, 1997; Mahoney, 2000). Participation in extracurricular and service learning activities has also been linked to increases in interpersonal competence, self-concept, high school GPA, school engagement, and educational aspirations (Elder & Conger, 2000; Marsh & Kleitman, 2002; Youniss, McLellan, & Yates, 1999), as well as to higher educational achievement, better job quality, more active participation in the political process and other types of volunteer activities, continued sport engagement, and better mental health during young adulthood (Barber, Eccles, & Stone, 2001; Glancy, Willits, & Farrell, 1986; Marsh, 1992; Youniss, McLellan, Su, & Yates, 1999). Finally, sports participation has been linked to lower likelihood of school dropout and higher rates of college attendance, particularly for low achieving and blue-collar male athletes (Barber et al., 2001, 2004; Eccles & Barber, 1999; Gould & Weiss, 1987; Marsh & Kleitman, 2003; McNeal, 1995).

In this paper, we focus on sport and exercise participation in wave 2 of the CDS of the PSID. We have several goals: First, we wanted to determine if we can replicate the findings of a positive association between team sport participation and other indicators of healthy adolescent development, using just Wave 2 data. Second, we wanted to determine if we get similar positive associations of sport and other exercise-related participation with indicators of healthy adolescent development. Third, we wanted to compare our findings using several different indicators of participation and time use. The CDS is unique in having both time diaries and stylized time estimates of participation in many activities, including sport and exercise-related

activities. There are distinct advantages of both types of time use indicators. Time diaries are widely acknowledged to be the most reliable and valid indicators of time use for the days sampled. However, given that the time diaries were only collected for two days, it is likely that relatively infrequent or seasonal activities will be underestimated at the level of the individual using this approach. Stylized time indicators help correct this problem but they rely on memory and thus have all of the problems associated with recall data. We wanted to compare the patterns of association across both of these methods. As you will see, the patterns of findings are quite similar

In addition, both types of time estimates can be treated as either a dichotomous yes/no variable or a continuous assessment of actual time spent. We also wanted to compare the findings using these two different types of participation variables. As you will see, the patterns of association across these two indicators of participation within the time diaries and stylized questions are quite similar.

METHODS AND ANALYTIC PLAN

Data for this study are from the Child Development Supplement (CDS) of the Panel Study for Income Dynamics (PSID). The PSID began in 1968 as a nationally representative sample of 5,000 American families who were interviewed every year until 1997, after which data collection occurred biannually. Data collection since 1968 includes members from the original families that started their own households after leaving home. As such, the sample size has steadily increased since 1968. In 1997, the PSID added the CDS to address the lack of information on children. Thus, the objective of the CDS was to provide a nationally representative database on children and families to support studies of the effects of parental and community resources on child health and development. Families with children from ages 0-12 were identified and were sent a time diary (henceforward TD) that would supplement the interviews with the child's primary caregiver about each child (up to 2 kids per household). Two TDs were collected per child; one that was completed within three days of a designated weekday and the other within one week of a designated weekend day. The TDs were reviewed and edited by interviewers and codes were created for each activity recorded. A similar procedure was used in 2002 when the second wave of data were collected on these same families—the children now being between 6 and 18 years of age.

The current analysis was conducted among 1584 children ages 10 to 18 (781 males and 803 females) that completed time diaries and the stylized measures on sports participation during the 2002 data collection wave. We assess the link between sports participation and four indicators of adolescent development: 1) self-confidence 2) physical health, 3) negative behaviors, and 4) educational aspirations. We use both time dairies and stylized survey items on sports participation to estimate the following equation;

$$\text{Outcome} = \beta_0 + \beta_1 (\text{Female}) + \beta_2 (\text{Middle Adolescent}) + \beta_3 (\text{Late Adolescent}) + \beta_4 (\text{Sports}) + e \qquad (1)$$

where *Female* is dichotomous measure of sex (1 = female and 0 = male), *Middle* and *Late Adolescent* are dummy variables for children ages 13-15 and 16-18, respectively (early adolescent or children ages 10-12 are omitted), *Sports* is a measure of sports participation, and an error term. While β_1 allows us to determine whether gender difference exist on the outcome, β_2 and β_3 allow us to assess how children in middle and late adolescence differ on the outcomes from children in early adolescence. We estimate equation 1 for sports measured as 1) a dichotomous variable (1 = child participated and 0 = child did not participate) and 2) as time spent engaged in sports (henceforward the frequency measure). We also interact sports with 1) *female*, 2) *Middle Adolescent* and 3) *Late Adolescent* to determine whether the link between sports and the outcomes differs by gender and stage of development. As such, there are four models for each outcome. While Model 1 in the results estimates equation 1 using the dichotomous measure of sports, Model 2 includes the interaction terms with the dichotomous measure of sports. Models 3 and 4 repeat these analyses using the frequency measure of sports. Since we assess these models for both the time diary and stylized measures of sports, it is important to note that Models 1-4 in the results correspond to the equations that contain the time diary measures of sports and Models 1' to 4' correspond to the equations that contain the stylized measures of sports. Table 1 contains detailed description for the measures used in the current analysis.

[Table 1 about here]

Table 2 shows that whereas 14 percent of the total sample recorded spending time on sports in the time diaries, 41 percent reported doing so on the stylized measure of sports participation. Furthermore, of the 214 children that reported spending some time on sports in the time diaries, 192 (90%) also reported involvement in sports on the stylized survey items. However, this is only 23 percent of the total number of children that reported spending time on sports on the dichotomous stylized measure (846). Thus, it appears that the stylized measure captures sport involvement among a greater portion of the sample than the time diary sports measure ($\chi^2 = 131.10$, $p < .001$).

RESULTS

Association between Sports Participation and Self-Confidence

Table 3 contains the findings for the equations predicting self-confidence with the top panel predicting global self-worth and the bottom panel predicting social initiative. With regard to global self-worth, Models 1 and 1' show that children who report participating in sports have higher global self-worth than those who do not using both the time diary ($b = .111$ in Model 1) and the stylized item ($b = .137$ in Model 1') equations. Models 2 and 2' show that females benefit less than males from sports participation in both the time diary equation ($b = -.145$ in Model 2) and the stylized equation ($b = -.122$ in Model 2'). Also, sports participation leads to greater global self-worth for children in both middle adolescence ($b = .317$ in the TD equation in Model 2 and .105 in the stylized equation in Model 2') and late adolescence ($b = .496$ in the TD equation in Model 2 and .167 in the stylized equation in Model 2') than for children in early adolescence. The findings do not differ substantively when the frequency measures are used.

The bottom panel of Table 3 shows that sports participation leads to increased social initiative (b = .401 for the TD equation in Model 1 and .443 for the stylized equation in Model 1'). The findings for both types of measures also show that females benefit more from sports participation than males (b = .333 for the TD measure in Model 2 and .173 for the stylized measure in Model 2'). Similarly, children in late adolescence benefit more from sports participation than their middle adolescent counterparts in both the TD equation (b = .599 in Model 2) and the stylized equation (b = .481 in Model 2'). The findings do not differ substantively when the frequency measures are used with the exception of the interaction between female and the time diary frequency measure in Model 4, which is not significant.

[Table 3 about here]

Association between Sports Participation and Physical Health

Table 4 contains the findings that assess the link between sports participation and physical health. The top panel of Table 4 shows that children who participate in sports have lower body mass index than those who do not regardless of how sports is measured (b = -.969 in Model 1 and -.031 in Model 3 for the dichotomous and frequency time diary sports measures, respectively, and -.818 in Model 1' and -.192 in Model 3' for the dichotomous and frequency stylized sports measures, respectively). Similarly, the bottom panel of Table 4 show that children who participate in sports have higher self-reported health than those who do not on all measures of sports participation (b = .251 in Model 1 and .023 in Model 3 for the dichotomous and frequency time diary sports measures, respectively, and .240 in Model 1' and .052 in Model 3' for the dichotomous and frequency stylized sports measures, respectively).

Some differences emerge with regard to the interaction effects predicting body mass index. First, middle adolescent children in the dichotomous stylized equation are the only group for which the findings show greater declines in body mass index from sports participation (*b* = -.300 in Model 2'). While both dichotomous measures suggest that females experience smaller declines in body mass index than males (*b* = .377 and .490 for the time diary and stylized measure, respectively), the dichotomous time diary measure shows no difference in the effect of sports participation between early adolescent and late adolescent children (the stylized measure does show a difference in the effect of sports for these groups in Model 2'). With regard to the frequency measures, while the findings indicate that females experience a smaller decline in body mass index the more time they spend engaged in sports (*b* = .040 in Model 4 for the time diary measure and .075 in Model 4' for the stylized measure), the time diary and stylized measures differ in how they interact with the stage of development variables. Specifically, relative to early adolescent children, a difference exists in the effect of time engaged in sports and body mass index for middle adolescent children when the time diary measure is used (*b* = .069 in Model 4) and for late adolescent children when the stylized measure is used (*b* =.179 in Model 4').

With regard to the interaction effects predicting self-reported health, the findings show that females benefit more from sports participation, though only for the dichotomous time diary sports measures (*b* = .102 in Model 2). While both dichotomous sports measures suggest an increasing effect of sports participation during adolescence, the time diary frequency sports measure suggests a U-shaped relationship between stage of development and self-reported health when development is interacted with sports participation; relative to early adolescent children, the effect of time engaged in sports is lower for children in middle adolescence (*b* = -.015 in

Model 4) and higher for children in late adolescence (b = .012 in Model 4). In contrast, the stylized frequency sports measures suggest an increasing effect of sports participation during adolescence.

[Table 4 about here]

Association between Sports Participation and Negative Behaviors

Table 5 presents results that assess the association between sports participation and alcohol/marijuana use. Since both alcohol use and marijuana use are dichotomous variables (yes = 1 and no = 0), we provide both logit coefficients and odds ratios for each of the models in Table 5. Odds ratios represent the exponentiated logit coefficients. If the odds ratio for females is 1.5 for example, then their odds of having a "yes" response on the outcome is 50 percent greater than the odds of males. In contrast, an odds ratio of .755 for females indicates that they are only 75.5 percent as likely as males to have a response of "yes" on the outcome.

Table 5a predicts whether the respondents have ever used alcohol. The findings suggest that sports is not associated with the likelihood of having ever used alcohol (although the frequency time diary measure has a significant coefficient, the odds ratio is rather small). Also, all measures of sports suggest that females who engage in sports are more likely to report that they have used alcohol than males who engage in sports; sports participation seems to be a greater deterrent of alcohol use for boys than for girls. Similarly, all sports measures indicate that late adolescent youths who engage in sports are less likely to have used alcohol than their younger counterparts who engage in sports. This suggests that the children who engage in sports and do not use alcohol during middle adolescence are more likely to persist in sports into late adolescence than those who engage in sports and use alcohol during middle adolescence.

[Table 5a about here]

Table 5b predicts whether the respondents have ever used marijuana. The findings for all sports measures indicate that *sports* is negatively associated with the likelihood of having ever used marijuana. Also, similar to the previous analysis, all measures of sports suggest that females who engage in sports are more likely to report that they have used marijuana than males who engage in sports. Thus, sports participation seems to be a greater deterrent of both alcohol and marijuana use for boys than for girls. Finally, the findings show that late adolescent youths who engage in sports are more likely to have used marijuana than their younger counterparts who engage in sports (with the except of the dichotomous stylized measure in Model 2'). Thus, sports seem to be a greater deterrent of marijuana use for middle adolescent children than for late adolescent children.

[Table 5b about here]

Association between Sports Participation and Educational Aspiration

The findings in Table 6 show that all sports measures have a positive association with educational aspirations. The magnitude of this association is smaller for females relative to males for the time diary frequency measure, however (b = -.018). Finally, while the stylized interaction models (i.e., Models 2' and 4') suggest no sex differences in the association between sports and educational aspiration, they indicate that the positive association between sports and educational aspiration is stronger for the late adolescent children relative to their middle adolescent counterparts.

[Table 6 about here]

Summary

The findings show that both the time diary and stylized sports measures yield substantively similar results. In order to create greater ease in identifying the patterns, we present three figures that illustrate the size of the effects of the sports measures on the outcomes used in this study. While Figure 1 shows the patterns that exist with regard to the main effect of the sports measures, Figures 2 and 3 show the patterns with regard to the interaction effects. The primary pattern that emerges in Figures 1 and 2 is that the time diary and stylized measures do not contradict one another; the effects are always in the same direction. Figure 3 shows that there are only 2 cases in which a contradiction occurs between the time diary and stylized measures: the interaction between sports and middle adolescent predicting body mass index (Figure 3a in the top panel of Figure 3) and self-reported health (Figure 3b in the top panel of Figure 3).

[Figure 1 about here]

[Figure 2 about here]

[Figure 3 about here]

CONCLUSION AND DISCUSSION

Five major conclusions are supported by our findings. First, as has been shown in other studies, there is a positive association between participation in team sports and other indicators of positive adolescent development. At the main effect level, this hold true for all five of our indicators. Second, these main effects emerge for both the time diary and the stylized time question data. However, the effect sizes are typically larger for the stylized questions. Third, the

number of youth identified as participating in team sports is substantially lower using the time diary method compared to the stylized questions. Furthermore, the percentage of adolescents participating in team sports from the stylized questions more closely approximates the percentage currently being estimated in other studies. Fourth, when gender differences emerge, the associations between sport participation and other indicators of healthy adolescent development are larger for males than for females; the one exception being social initiative for which the effect is greater for females than for males. Fifth, when age differences emerge, in general the associations are stronger for older youth than for younger youth.

As we noted in the introduction, many studies now document a positive association of team sport participation and other aspects of positive youth development. The CDS – II data essentially replicate this pattern of findings. In addition, while some other, older studies have found that alcohol use is higher amongst athletes than non-athletes, the CDS – II data show no such effect. What might these associations mean? It is widely argued that team sport participation influenced positive development on all of these types of indicators for the reasons outlined in our introduction (see Eccles et al., 2003, 2004). However, it is also quite possible that either selection factors or reverse causation explain these associations. Thus, we must be cautious in drawing any causal inferences from our findings. In the future, we plan to use Wave 1 data to help model these alternative explanations.

The lack of association with alcohol use may reflect historical changes in the use of alcohol in either the athlete or non-athlete populations. We have to do very careful comparative assessment across studies before we more fully explain this shift in significance across time.

Methodologically, it is good that the major findings, by and large, replicate across both types of measures and both dichotomous and continuous uses of these measures. These findings

suggest that either method will yield the expected significant relations – indicating good predictive validity for both methods. It should be noted, however, that the stylized frequency measure consistently yields the strongest coefficients. This could reflect the fact that the time diary identifies so few individual as team sport participants (214 versus 846 using the stylized questions). It is likely that team sports is one of those low frequency activities that are not well captured by two days of time diaries. Methodologically, this means that one should either gather stylized questions on specific low frequency experiences in conjunction with the time diaries or gather many more days of time diaries. The exact number of days is yet to be determined and is likely to vary depending on the type of activity one is concerned with measuring as reliably and validly as possible. For example, for something like team sport participation that can be quite seasonal, one would need to take time diary estimates for weeks during each of the four seasons. One would probably need more than two days per week as well.

Although the gender and age differences are quite interesting, interaction findings are less stable across measures and thus must be interpreted cautiously. With regard to Body Mass Index, girls benefit less from team sport participation than males, perhaps because there are stronger cultural norms regarding the importance of being thin for women than for men.

The findings for alcohol use are particularly intriguing for two reasons: First, they are counter-intuitive in terms of both the sport effect and the fact that the mean levels do not differ between males and females. Second, this pattern is different from studies done in the 80s when being a member of sport team was associated with higher rates of alcohol use for males. Why should sports be more protective for the males than for the females against high rates of alcohol use and why are we finding historical differences? Eccles and her colleagues (2003) argued that the link between sports and drinking would depend on the peer culture associated with team

sports and that this peer culture is likely to differ across schools, communities, and historical time. One possibility, then, is that female athletes today are being socialized into more male-typed behavior, like drinking alcohol, by their peer groups as a result of being involved in the world of athletics – a male-typed arena of activity. It is also possible that recent efforts to deal with teenage drinking have resulted in a less supportive attitude towards drinking alcohol amongst athletes than was true 10-20 years ago. In support of this suggestion, our finding that the benefits of team sport participation in terms of alcohol consumption are largest for the oldest cohort as noted earlier.

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TABLE 1. Means, Standard Deviations, and Descriptions for Variables Used in the Analysis: MADICS 1996

Variable Name	Description	Metric	Means (SD) Females	Means (SD) Males	Alpha
Sports: Time Diaries, includes meets/games/practices for team-based sports.					
a) Sports	Participated in Sporting activity.	0 = Reported zero time in sports 1 = Reported some time in sports	.13 (.34)	.17 (.38)	---
b) Sports	Hours engaged in sports during a week estimated as: (sum of weekday minutes x 5 and weekend day minutes x 2)/60.	Low = 0 High = 38.33	1.47 (4.54)	1.58 (4.06)	---
Sports: Stylized Measures					
a) Sports	Were you a member of any athletic or sports teams in the last 12 months?	0 = No 1 = Yes	.50 (.50)	.57 (.50)	---
b) Sports	How often youth spent time on athletic sports teams at school during the last 12 months.	1 = Less than once a month 6 = Everyday while program lasted	2.27 (2.51)	2.58 (2.53)	---
Outcomes					
1) *Self-Confidence* [a]					
Global Self-Worth	(a) Overall, I have a lot to be proud of; (b) I can do things as well as most people; (c) A lot Of things about me are good; (d) I'm as good As most other people; (e) Other people think I am a good person; (f) When I do something, I do it well.	1 = Never 5 = Always	4.06 (.64)	4.00 (.63)	.806
Social Initiative	(a) I had conversations with adults (like teachers staff) at the school; (b) I talked to teachers and other adults about things other than class; (c) I asked questions in class when I didn't understand the material; (d) I joined in class discussions; (e) I was comfortable joking with teachers and other adults.	1 = Never 6 = Everyday	3.57 (1.32)	3.68 (1.27)	.816
2) *Physical Health*					
Body Mass Index	(Weight in pounds / height in inches^2) * 703	Low = 10 High = 60	22.39 (5.60)	22.58 (5.73)	---
Self-Reported Health	Regarding youth's overall health: In general, how is your health.	1 = Poor 5 = Excellent	3.83 (.94)	4.01 (.87)	---
3) *Negative Behaviors*					
Alcohol Use	Have you had a drink of beer, wine, or liquor—not just a sip or a taste of someone else's drink—more than 2 or 3 times in your life?	0 = No 1 = Yes	.47 (.50)	.50 (.50)	---
Drug Use	Have you ever tried marijuana?	0 = No 1 = Yes	.25 (.43)	.23 (.42)	---

Table 1 continued on next page

(TABLE 1 Continued)

Variable Name	Description	Metric	Means (SD) Females	Means (SD) Males	Alpha
4) Educational Outcome					
Educational Aspiration	How far would you like to go in school?	1= < H.S. 7= > 4yr Coll. Degree	5.63 (1.55)	5.29 (1.77)	---

Note:

[a] Responses to these items a in reference to the past month.

Table 2. Crosstabs of the Stylized Sports Measure and the Time Diary Sports Measure

		Stylized Measure		
		Yes	No	Total
Time Diary	Yes	192	22	214
	No	654	716	1370
	Total	846	738	1584
		Chi-Square = 131.10, $p < .001$		

Table 3. Unstandardized Coefficients of Self-Confidence Measures on Sex, Age, Sports, and Controls

	Global Self-Worth							
	Sports Measured as Yes/No				Sports Measured as Time			
Ind. Variables	(1)	(1')	(2)	(2')	(3)	(3')	(4)	(4')
Sex (Males Omitted)								
Female	.077***	.082***	.101***	.147***	.075***	.083***	.102***	.115***
	(.007)	(.007)	(.008)	(.011)	(.007)	(.007)	(.008)	(.010)
Age (Age 10-12 Omitted)								
Age 13-15	-.092***	-.090***	-.134***	-.145***	-.098***	-.102***	-.115***	-.168***
	(.009)	(.009)	(.010)	(.013)	(.009)	(.009)	(.009)	(.013)
Age 16-18	-.025**	-.013	-.098***	-.100***	-.039***	-.031***	-.078***	-.114***
	(.009)	(.009)	(.010)	(.013)	(.009)	(.009)	(.010)	(.012)
Sports								
Y/N	.111***	.137***	-.105***	.110***	---	---	---	---
	(.010)	(.008)	(.021)	(.015)				
Time	---	---	---	---	.015***	.032***	.003	.015***
					(.001)	(.001)	(.003)	(.003)
					[.103]	[.127]		
Interactions								
Female * Sports	---	---	-.145***	-.122***	---	---	-.016***	-.013***
			(.020)	(.015)			(.002)	(.003)
Age 13-15 * Sports	---	---	.317***	.105***	---	---	.020**	.029***
			(.025)	(.018)			(.003)	(.004)
Age 16-18 * Sports	---	---	.496***	.167***	---	---	.028***	.036***
			(.026)	(.018)			(.003)	(.004)
Constant	3.556***	3.497***	3.566***	3.514***	3.563***	3.516***	3.563***	3.560***
	(.023)	(.023)	(.023)	(.024)	(.023)	(.023)	(.023)	(.024)
R^2	.055	.063	.070	.068	.062	.067	.069	.071

	Social Initiative							
	Sports Measured as Yes/No				Sports Measured as Time			
Ind. Variables	(1)	(1')	(2)	(2')	(3)	(3')	(4)	(4')
Sex (Males Omitted)								
Female	-.088***	-.083***	-.138***	-.165***	-.099***	-.075***	-.097***	-.104***
	(.019)	(.019)	(.021)	(.028)	(.019)	(.019)	(.020)	(.026)
Age (Age 13-15 Omitted)								
Age 16-18	.419***	.448***	.320***	.194***	.399***	.428***	.354***	.208***
	(.019)	(.019)	(.021)	(.028)	(.019)	(.019)	(.020)	(.026)
Sports								
Y/N	.401***	.443***	-.029	.133***	---	---	---	---
	(.025)	(.019)	(.041)	(.031)				
Time	---	---	---	---	.036***	.102***	.021***	.053***
					(.002)	(.004)	(.004)	(.006)
					[.138]	[.206]		
Interactions								
Female * Sports	---	---	.333***	.173***	---	---	.002	.015*
			(.050)	(.037)			(.004)	(.007)
Age 16-18 * Sports	---	---	.599***	.481***	---	---	.024***	.085***
			(.050)	(.038)			(.004)	(.007)
Constant	2.820***	2.693***	2.852***	2.881***	2.835***	2.737***	2.850***	2.849***
	(.056)	(.056)	(.056)	(.058)	(.056)	(.056)	(.056)	(.057)
R^2	.078	.092	.087	.102	.083	.105	.085	.112

Notes: Numbers in parentheses are standard errors. Numbers in brackets are standardized coefficients. All models include controls for race, family structure, parents' education and income. Number of observations (Unweighted) is 1579 for *global self-worth* and 986 for *social initiative*.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Table 4. Unstandardized Coefficients of Health on Sex, Age, Sports, and Controls

	Body Mass Index							
	Sports Measured as Yes/No				Sports Measured as Time			
Ind. Variables	(1)	(1')	(2)	(2')	(3)	(3')	(4)	(4')
Sex (Males Omitted)								
Female	-.240***	-.255***	-.303***	-.506***	-.202**	-.260***	-.276***	-.425***
	(.065)	(.065)	(.070)	(.095)	(.065)	(.064)	(.069)	(.090)
Age (Age 10-12 Omitted)								
Age 13-15	2.278***	2.253***	2.196***	2.417***	2.266***	2.326***	2.171***	2.367***
	(.077)	(.077)	(.084)	(.117)	(.078)	(.077)	(.082)	(.109)
Age 16-18	4.025***	3.943***	4.015***	3.769***	4.032***	4.048***	4.062***	3.635***
	(.079)	(.079)	(.086)	(.114)	(.080)	(.079)	(.085)	(.108)
Sports								
Y/N	-.969***	-.818***	-1.376***	-1.080***	---	---	---	---
	(.090)	(.065)	(.182)	(.129)				
Time	---	---	---	---	-.031***	-.192***	-.080***	-.292***
					(.007)	(.013)	(.022)	(.027)
					[.-024]	[-.086]		
Interactions								
Female * Sports	---	---	.377*	.490***	---	---	.040**	.075**
			(.179)	(.129)			(.015)	(.025)
Age 13-15 * Sports	---	---	.523*	-.300*	---	---	.069**	-.005
			(.217)	(.156)			(.024)	(.032)
Age 16-18 * Sports	---	---	.122	.370*	---	---	.005	.179***
			(.225)	(.160)			(.022)	(.032)
Constant	21.879***	22.250***	21.942***	22.434***	21.885***	22.143***	21.940***	22.392***
	(.199)	(.200)	(.200)	(.213)	(.199)	(.199)	(.200)	(.209)
R^2	.117	.118	.117	.119	.114	.120	.115	.122

	Self-Reported Health							
	Sports Measured as Yes/No				Sports Measured as Time			
Ind. Variables	(1)	(1')	(2)	(2')	(3)	(3')	(4)	(4')
Sex (Males Omitted)								
Female	-.158***	-.153***	-.171***	-.140***	-.166***	-.152***	-.156***	-.161***
	(.011)	(.011)	(.012)	(.016)	(.011)	(.011)	(.011)	(.015)
Age (Age 10-12 Omitted)								
Age 13-15	-.027*	-.022	-.034*	-.087***	-.034**	-.042***	-.009	-.091***
	(.013)	(.013)	(.014)	(.019)	(.013)	(.013)	(.014)	(.018)
Age 16-18	-.095***	-.072***	-.160***	-.259***	-.114***	-.101***	-.138***	-.286***
	(.013)	(.013)	(.014)	(.019)	(.013)	(.013)	(.014)	(.018)
Sports								
Y/N	.251***	.240***	.029	.090***	---	---	---	---
	(.015)	(.011)	(.030)	(.021)				
Time	---	---	---	---	.023***	.052***	.024***	.012**
					(.001)	(.002)	(.004)	(.004)
					[.110]	[.145]		
Interactions								
Female * Sports	---	---	.102***	-.018	---	---	-.004	.005
			(.030)	(.021)			(.003)	(.004)
Age 13-15 * Sports	---	---	.081*	.121***	---	---	-.015***	.025***
			(.036)	(.026)			(.004)	(.005)
Age 16-18 * Sports	---	---	.441***	.368***	---	---	.012**	.080***
			(.037)	(.026)			(.004)	(.005)
Constant	3.683***	3.578***	3.702***	3.677***	3.692***	3.614***	3.685***	3.717***
	(.033)	(.033)	(.033)	(.035)	(.033)	(.033)	(.033)	(.035)
R^2	.048	.055	.054	.061	.050	.058	.053	.066

Notes: Numbers in parentheses are standard errors. Numbers in brackets are standardized coefficients. All models include controls for race, family structure, parents' education and income. Number of observations (Unweighted) is 1566 for *body mass index* and 1579 for *self-reported health*.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Table 5a. Logistic Coefficients and Odds Ratios of Alcohol Use on Sex, Age, Sports, and Controls

	Ever Drank Alcohol															
	Sports Measured as Yes/No								Sports Measured as Time							
Ind. Variables	(1)	Odds Ratio	(1')	Odds Ratio	(2)	Odds Ratio	(2')	Odds Ratio	(3)	Odds Ratio	(3')	Odds Ratio	(4)	Odds Ratio	(4')	Odds Ratio
Sex (Males Omitted)																
Female	-.206***	.814	-.206***	.814	-.382***	.683	-.372***	.689	-.203***	.816	-.208***	.812	-.360***	.698	-.280***	.756
	(.032)		(.032)		(.035)		(.047)		(.032)		(.032)		(.035)		(.045)	
Age (Age 13-15 Omitted)																
Age 16-18	1.203***	3.331	1.206***	3.340	1.300***	3.670	1.362***	3.904	1.195***	3.304	1.203***	3.330	1.331***	3.786	1.276***	3.582
	(.032)		(.032)		(.035)		(.047)		(.032)		(.032)		(.034)		(.045)	
Sports																
Y/N	.037	1.038	.036	1.036	-.199**	.819	.019	1.019	---		---		---		---	
	(.042)		(.032)		(.070)		(.053)									
Time	---		---		---		---		.017***	1.017	-.001	.999	.013*	1.013	.000	1.000
									(.003)		(.006)		(.006)		(.010)	
Interactions																
Female * Sports	---		---		.948***	2.580	.290***	1.336	---		---		.069***	1.072	.026*	1.026
					(.084)		(.064)						(.007)		(.012)	
Age 16-18 * Sports	---		---		-.435***	.647	-.273***	.761	---		---		-.057***	.944	-.026*	.974
					(.084)		(.064)						(.007)		(.012)	
Constant	.231*		.221*		.227*		.229*		.233*		.233*		.203*		.239*	
	(.094)		(.095)		(.095)		(.098)		(.094)		(.094)		(.095)		(.096)	
Chi-Square	1980.71		1981.19		2138.26		2017.08		2008.65		1979.95		2221.62		1988.68	

Notes: Numbers in parentheses are standard errors. All models include controls for race, family structure, parents' education and income. Number of observations (Unweighted) is 1012.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Table 5b. Logistic Coefficients and Odds Ratios of Marijuana Use on Sex, Age, Sports, and Controls

	Ever Used Marijuana															
	Sports Measured as Yes/No								Sports Measured as Time							
Ind. Variables	(1)	Odds Ratio	(1')	Odds Ratio	(2)	Odds Ratio	(2')	Odds Ratio	(3)	Odds Ratio	(3')	Odds Ratio	(4)	Odds Ratio	(4')	Odds Ratio
Sex (Males Omitted)																
Female	-.031	.969	-.041	.960	-.093*	.911	-.436***	.646	-.010	.990	-.063	.939	-.086*	.917	-.277***	.758
	(.038)		(.038)		(.041)		(.053)		(.038)		(.039)		(.040)		(.051)	
Age (Age 13-15 Omitted)																
Age 16-18	1.789***	5.983	1.754***	5.776	1.733***	5.660	1.783***	5.950	1.796***	6.028	1.781***	5.933	1.758***	5.801	1.691***	5.427
	(.041)		(.041)		(.043)		(.058)		(.041)		(.041)		(.043)		(.054)	
Sports																
Y/N	-.590***	.554	-.471***	.625	-1.244***	.288	-.928***	.395	---		---		---		---	
	(.057)		(.039)		(.135)		(.078)									
Time	---		---		---		---		-.021***	.979	-.129***	.879	-.077***	.926	-.221***	.802
									(.004)		(.008)		(.011)		(.016)	
Interactions																
Female * Sports	---		---		.518***	1.678	.838***	2.311	---		---		.047***	1.048	.102***	1.107
					(.115)		(.077)						(.008)		(.015)	
Age 16-18 * Sports	---		---		.543***	1.722	.029	1.029	---		---		.035***	1.035	.055***	1.056
					(.138)		(.083)						(.011)		(.017)	
Constant	-1.214***		-1.097***		-1.185***		-.877***		-1.241***		-1.105***		-1.218***		-.917***	
	(.112)		(.113)		(.112)		(.117)		(.112)		(.113)		(.112)		(.115)	
Chi-Square	2791.42		2823.78		2828.41		2944.12		2704.52		2974.87		2748.14		3034.19	

Notes: Numbers in parentheses are standard errors. All models include controls for race, family structure, parents' education and income. Number of observations (Unweighted) is 1009.

* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Table 6. Unstandardized Coefficients of Educational Aspiration on Sex, Age, Sports, and Controls

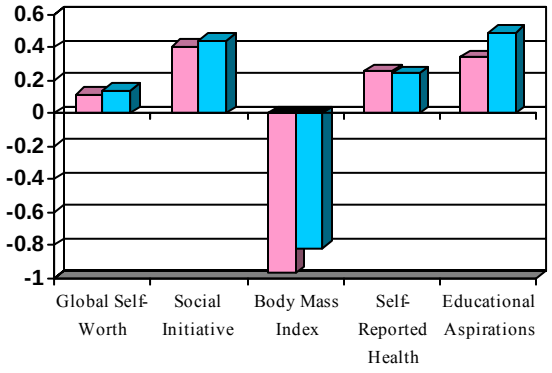
	Educational Aspirations							
	Sports Measured as Yes/No				Sports Measured as Time			
Ind. Variables	(1)	(1')	(2)	(2')	(3)	(3')	(4)	(4')
Sex (Males Omitted)								
Female	.362***	.381***	.382***	.404***	.352***	.391***	.385***	.362***
	(.024)	(.024)	(.026)	(.034)	(.024)	(.023)	(.025)	(.033)
Age (Age 13-15 Omitted)								
Age 16-18	-.126***	-.085***	-.147***	-.253***	-.137***	-.104***	-.135***	-.196***
	(.024)	(.023)	(.026)	(.034)	(.024)	(.023)	(.025)	(.033)
Sports								
Y/N	.337***	.492***	.331***	.352***	---	---	---	---
	(.032)	(.024)	(.053)	(.040)				
Time	---	---	---	---	.019***	.118***	.032***	.093***
					(.002)	(.005)	(.005)	(.008)
					[.057]	[.186]		
Interactions								
Female * Sports	---	---	-.108	-.025	---	---	-.018***	.013
			(.064)	(.047)			(.005)	(.009)
Age 16-18 * Sports	---	---	.120	.317***	---	---	-.004	.037***
			(.064)	(.047)			(.005)	(.009)
Constant	3.240***	3.088***	3.245***	3.176***	3.255***	3.131***	3.250***	3.192***
	(.071)	(.070)	(.071)	(.073)	(.071)	(.070)	(.071)	(.071)
R^2	.116	.131	.116	.133	.114	.143	.114	.144

Notes: Numbers in parentheses are standard errors. Numbers in brackets are standardized coefficients. All models include controls for race, family structure, parents' education and income. Unweighted N is 987.

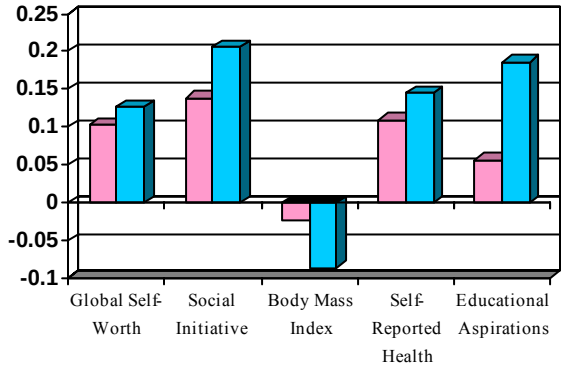
* $p < .05$ ** $p < .01$ *** $p < .001$ (two-tailed tests)

Figure 1. The Effect of Sports Participation for both Time Diaries and the Stylized Items on the Developmental Outcomes

(a) Dichotomous Measures



(b) Frequency Measures (Standardized Effect)



(c) Odds Ratio for Alcohol and Marijuana Use

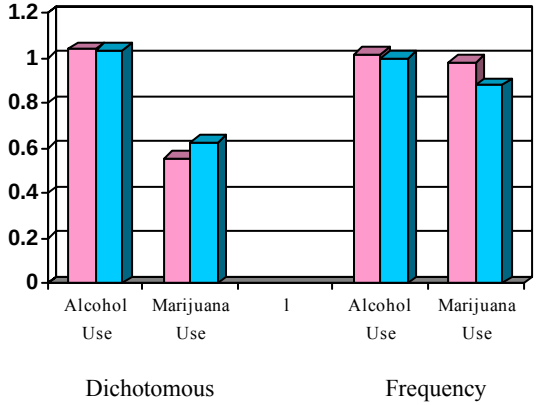
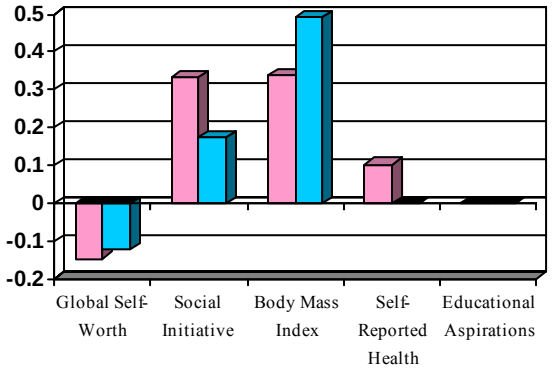
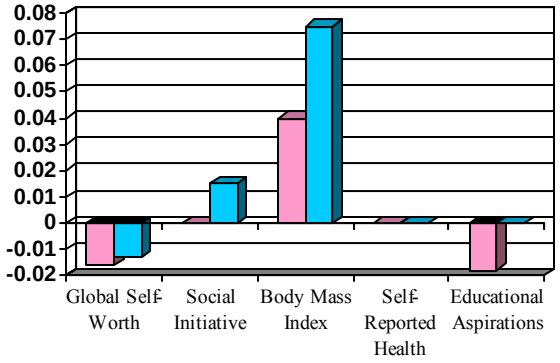


Figure 2. Difference In The Effect Size of the Dichotomous Sports Measures for Females Relative to Males (Males = 0)

(a) Dichotomous Measures



(b) Frequency Measures



(c) Odds Ratio for Alcohol and Marijuana Use

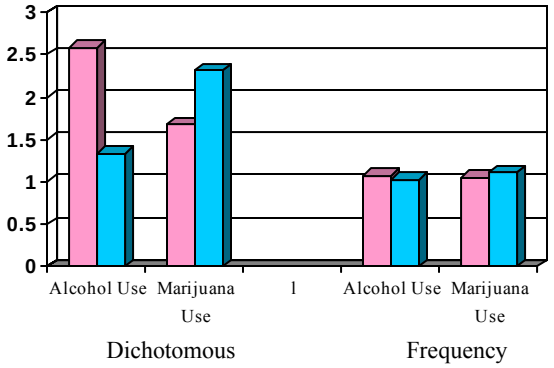
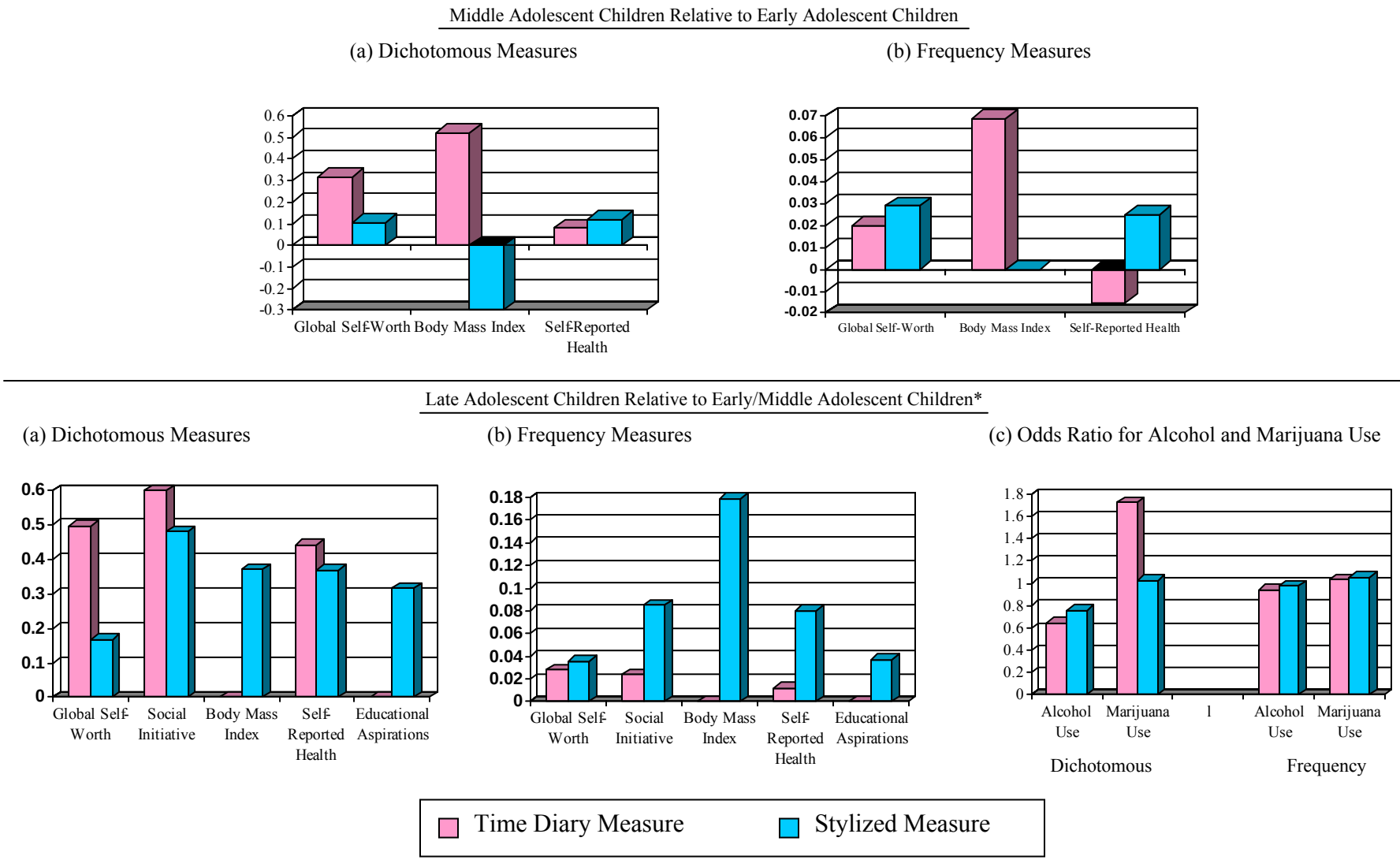


Figure 3. Difference In The Effect Size of the Dichotomous Sports Measures for Different Age Groups



* Note: Early adolescent children is the reference group for all outcomes except *social initiative* and *educational aspiration*, for which middle adolescent children is the reference group.