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# Physically Active Adults: An Analysis of the Key Variables That Keep Them Moving

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**Running Head: Physical Activity in Adulthood**

Physically Active Adults: An Analysis of the Key Variables that Keep them Moving

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**Abstract**

**Background:** A large proportion of adults are insufficiently physically active, and researchers have yet to determine the factors that enable individuals to maintain adequate levels of physical activity throughout adulthood. **Purpose:** This study sought to identify the key variables linked with consistent physical activity in adulthood as elucidated by a criterion sample of physically active adults. **Methods:** 157 participants aged 24 and over who engaged in consistently high levels of physical activity rated the extent to which all of the potential correlates of physical activity identified in the research literature impacted their own activity level. **Results:** Participants reported that psychological, behavioral, and social/interpersonal factors disproportionately served as facilitators that increased their physical activity, when compared to environmental, policy, and demographic factors. **Discussion:** An ecological approach is necessary for understanding the physical activity behavior of individuals and the factors that support and inhibit adequate physical activity in adulthood. **Translation to Health Education:** Efforts to address the widespread problem of physical inactivity should utilize an ecological approach by minimizing potential environmental barriers to physical activity while also targeting key individual and interpersonal factors that facilitate consistent engagement in physical activity throughout adulthood.

**Keywords: built environment and health, health policy, physical activity, fitness, and health education**

## BACKGROUND

Consistent physical activity is linked with numerous physical and mental health benefits across the lifespan including improved cardiovascular fitness, bone health, functional health, and cognitive functioning.<sup>1</sup> Conversely, physical inactivity has been shown to increase adults' risk for numerous chronic health problems such as coronary heart disease, hypertension, diabetes, cancer, and depression,<sup>1-3</sup> Indeed, a recent report from the World Health Organization estimated that physical inactivity causes 30% of heart disease, 27% of type 2 diabetes, and 21-25% of breast and colon cancers worldwide.<sup>4</sup> Perhaps even more concerning, physical inactivity is believed to be responsible for 9% of all premature deaths across the globe, making it the fourth leading cause of death, on par with smoking and obesity.<sup>1,5</sup> Taken together, these data clearly indicate that physical inactivity is a potent and prominent risk factor for both chronic disease and early death.

Given the seriousness of the health consequences associated with inadequate physical activity, it is not surprising that the United States Centers for Disease Control (CDC) recommends that adults engage in at least 150 minutes of moderate intensity physical activity per week.<sup>6</sup> Unfortunately, only about 50% of American adults meet the CDC aerobic physical activity standards, and physical activity tends to decline from the age of 24 throughout adulthood.<sup>7-9</sup> An even smaller proportion (29.6%) meet the CDC recommended standard of two days per week of muscle strengthening activity, and 26.3% of American adults report engaging in no leisure-time physical activity at all.<sup>10</sup>

Recognizing these unacceptably low rates of physical activity and the associated consequences, researchers have sought to understand what factors may help people be more physically active. Traditionally, researchers in fields such as health, exercise science, and psychology primarily focused on examining intrapersonal factors associated with physical

activity across the lifespan.<sup>8,11,12</sup> Given this focus, intrapersonal variables such as sex, age, intention to exercise, personal history of exercise, and self-efficacy have shown the most consistent associations with physical activity in adults, though it is important to note that those findings are not particularly consistent across studies.<sup>8,9,12-16</sup>

More recently, researchers have called for an increased ecological focus in physical activity studies allowing for the examination of variables at several different levels that may influence an individual's physical activity behavior. Such models typically include variables in the following domains: intrapersonal (demographic, biological, psychological, and behavioral); interpersonal (social and cultural), environmental (built and natural environment); and most recently, systems level factors such as government policy and media influences.<sup>12</sup> Recent studies inspired by this expanded conceptual approach have revealed that social support from family and friends, seeing others being active, access to exercise equipment or facilities, neighborhood safety, and natural environmental beauty appear to be associated with physical activity to some extent.<sup>13,15,17-21</sup> That said, results have been so inconsistent both within and across studies<sup>20-24</sup> that not a single interpersonal, environmental, or systems level variable has proven to be a consistent correlate of physical activity as of yet.<sup>12</sup>

Overall, despite the numerous studies conducted thus far, no consensus has emerged regarding which variables are most important for achieving and maintaining adequate physical activity levels throughout adulthood. Perhaps even more problematic is the fact that most interventions aimed at increasing physical activity, particularly those targeting adults, have small to moderate effects at best.<sup>25,26</sup> The inconsistent findings and lack of intervention success raise the possibility that researchers have not yet identified the key variables that drive long-term adherence to a physically active lifestyle in adults. Part of the problem may be the relatively piecemeal approach of most studies, which have typically examined individuals exhibiting a

wide range of physical activity (and inactivity) and determined which of a relatively small number of variables are associated with higher activity levels. Recognizing this, researchers have conducted extensive reviews of the physical activity literature in an attempt to identify consistencies in the variables that impact activity levels in adults and children.<sup>8,12</sup> Unfortunately, those reviews have largely served to further highlight the inconsistencies found across studies.

Given the current state of the research literature it is possible that a more comprehensive examination of all the variables thought to be associated with physical activity within a single study may be useful. In addition, focusing on a criterion sample of adults who are consistently physically active at the recommended level may help clarify which variables are most important for maintaining an appropriate level of physical activity.

### **PURPOSE**

The purpose of this study was to identify the key variables linked with consistently engaging in the CDC recommended level of physical activity throughout adulthood. To that end, a sample restricted to adults who consistently engage in a high level of physical activity was utilized. Because physical activity, ultimately, is an individual behavior, it was hypothesized that intrapersonal variables (in particular, psychological and behavioral variables) would be most strongly linked with increased physical activity in this sample.

### **METHODS**

#### **Participants**

Potential participants were a convenience sample recruited primarily via face-to-face contact by research assistants who approached individuals in public settings (e.g., community events, school athletic events, parks, sidewalks, and other public spaces, etc.) in several different communities in the western United States over the course of a full calendar year. Some additional participants were recruited via word-of-mouth or email referral from other

participants. All potential participants were asked “We are conducting a research study about physical activity in adults, and I’m wondering if you would be interested in helping out with the study by answering some questions about your physical activity.” If they expressed interest, potential participants were pre-screened to determine whether they were age 24 or older and met the current recommended standards for aerobic physical activity published by the CDC<sup>6</sup> over at least the course of the past year. Adults aged 18-23 were excluded because physical activity actually peaks within that age range before declining from the age of 24 onward<sup>7</sup> making the 24 and over age group a critical one to study. All procedures and materials used in this study were approved by the author’s Institutional Review Board, and all participants provided informed consent.

### **Measures and Procedures**

**Physical Activity Pre-Screen.** Participants were asked either orally or in writing the following questions in a standardized format. 1) “Over the past year, how many days per week on average did you engage in Moderate to Vigorous aerobic physical activity – things that increase your heart rate and make you breathe harder than normal?” 2) “Over the past year, how much time on average did you usually spend doing Moderate to Vigorous aerobic physical activity on one of those days?” 3) “Over the past year, how many days per week on average did you do muscle strengthening activities such as lifting weights, yoga, sit-ups, or heavy gardening?” 4) “Are you 24 or older?” Written definitions of moderate and vigorous physical activity adapted from those provided by the CDC<sup>27</sup> were provided to all potential participants in case any uncertainty arose regarding whether the respondent’s physical activity intensity should be classified as moderate to vigorous. Respondents who reported meeting the current recommended standards for aerobic physical activity published by the CDC<sup>6</sup> over at least the

course of the past year were invited to complete the Variables Impacting Physical Activity survey.

**Variables Impacting Physical Activity Survey.** Participants completed a paper-and-pencil or online survey that contained 86 items assessing all of the variables identified in the research literature as potential correlates or determinants of physical activity in adulthood. Variables were drawn from an extensive review of theoretical and empirical physical activity studies in health, psychology, exercise science, and public health, and participants were asked to rate how much each of the variables impacts their own personal level of physical activity. The variables comprised the following eight domains: Psychological; Physical/Biological; Behavioral; Social/Interpersonal; Built Environment; Natural Environment; Other Policy/Global; and Demographics.

For each item other than demographics, participants were asked to first answer “Yes” or “No” (e.g., “Do you keep track of how physically active you are?”). Participants were then asked to rate the impact of each variable on their current level of leisure-time physical activity on the following 9-point scale: -4 = Decreases my Physical Activity Extremely; -3 = Decreases my Physical Activity A Lot; -2 = Decreases my Physical Activity Moderately; -1 = Decreases my Physical Activity A Little; 0 = Has No Effect on my Physical Activity; +1 = Increases my Physical Activity A Little; +2 = Increases my Physical Activity Moderately; +3 Increases my Physical Activity A Lot; +4 = Increases my Physical Activity Extremely. For the items assessing demographics, participants first provided a response to each item (e.g., “Do you live in a rural, suburban, or urban community?”) and then rated the impact of each demographic variable on their level of physical activity from -4 to +4 as noted above. Thus, all participants provided two answers to each of the 86 items, the first being their “Yes” or “No” response or the



demographic answer, and the second being their rating of each item's impact on their physical activity level on the 9-point scale.

### **Data Analyses and Hypothesis Testing**

In order to test the hypothesis that intrapersonal variables would be most strongly linked with increased physical activity in this sample, mean impact scores were calculated for each of the eight domains: Psychological; Physical/Biological; Behavioral; Social/Interpersonal; Built Environment; Natural Environment; Other Policy/Global; and Demographics. The means were comprised of all variables within each domain and included only ratings from respondents who endorsed each item as “Yes” or “No” in a way that was rated by participants (on average) as increasing physical activity. For example, in the Physical domain the item “Have you ever been injured when engaging in physical activity?” was rated as decreasing physical activity by those who responded “Yes,” so for that and other similar items the impact ratings of those who responded “No” were used to calculate mean domain impact scores. This was done to orient all ratings in the same direction and allow for a direct comparison of how much the variables within each domain were rated as increasing physical activity levels, thus allowing for a test of the main hypothesis.

A within-subjects one-way multivariate analysis of variance (MANOVA) with follow-up pairwise comparisons was conducted to test the hypothesis that intrapersonal variables (the psychological and behavioral domains) would be more strongly linked with increased physical activity than would environmental and systems level variables. Additional follow-up analyses (independent samples *t*-tests, one-way ANOVAs, and Pearson correlations) were conducted to determine whether any of the following demographic factors were associated with significantly different levels of aerobic or muscle strengthening physical activity: sex, age, ethnicity, marital status, community type, income, or educational level. In order to control for the number of

statistical analyses conducted, a Bonferroni corrected  $p$  value of .001 was used to determine statistical significance.

Finally, due to the nature and purpose of this study, several descriptive statistics were also calculated and reported. Because some past research has indicated sex differences in barriers to and facilitators of physical activity<sup>8,12</sup> participant responses were first separated by sex. Frequency distributions for all items on the Variables Impacting Physical Activity Survey were then analyzed to determine the percentage of female and male participants who answered affirmatively or negatively to each item. Next, female and male participants who responded “Yes” and those who responded “No” on each item were separated and descriptive statistics were calculated to determine mean rankings for all four groups (Female/Yes, Female/No, Male/Yes, Male/No) on the extent to which each variable impacted their current level of leisure-time physical activity on the 9-point rating scale.

## RESULTS

### Demographics and Physical Activity

One-hundred and fifty-seven adults (92 women and 65 men) met study criteria and agreed to participate. An independent samples  $t$ -test revealed that female (mean = 277.7, SD = 155.7) and male (mean = 328.1, SD = 211.2) participants did not significantly differ in how many minutes per week they engaged in moderate to vigorous aerobic activity,  $t(150) = 1.58$ ,  $ns$ . Both females and males exceeded the CDC recommended levels for moderate to vigorous aerobic activity of 150 minutes per week by at least two hours per week. An independent samples  $t$ -test indicated that males (mean = 2.7, SD = 1.7) and females (mean = 1.9, SD = 1.3) also did not significantly differ in the number of days they engaged in muscle strengthening per week,  $t(149) = 2.85$ ,  $ns$ , with females, on average, falling just below the CDC recommended standard of two days per week.

Participants ranged in age from 24 to 83 (mean = 45.5, sd = 13.1), and Pearson correlations revealed that age was not significantly correlated with either aerobic,  $r(128) = -.15$ , *ns*, or muscle strengthening,  $r(126) = .02$ , *ns*, physical activity. Eighty-two percent of the sample reported their ethnicity as European-American, 7.1% were Asian-American, 7.5% were Latino/a, 2.1% were African-American, and 1.3% described their ethnicity as bi- or multi-racial. One-way ANOVAs revealed no significant differences between ethnic groups on aerobic,  $F(4, 121) = 0.83$ , *ns*, or muscle strengthening,  $F(4, 117) = 1.26$ , *ns*, physical activity. Sixty-percent of participants reported having children, 75% were married or in a domestic partnership, 21.5% were single, 2% were divorced, and 1.5% were widowed. Independent samples *t*-tests indicated no significant differences in aerobic,  $t(112) = -.45$ , *ns*, or muscle strengthening,  $t(111) = 1.43$ , *ns*, physical activity between those who were married/partnered and those who were single/divorced/widowed.

An equal percentage of participants (43%) lived in urban or suburban communities, with the remaining 14% living in rural settings, and one-way ANOVAs revealed no significant differences between those three groups in aerobic,  $F(2, 95) = .028$ , *ns*, or muscle strengthening,  $F(2, 94) = .03$ , *ns*, physical activity. Regarding socioeconomic status, the median annual income was \$75,000, and income was not significantly correlated with either aerobic,  $r(106) = -.03$ , *ns*, or muscle strengthening,  $r(105) = .11$ , *ns*, physical activity. Finally, 55% of participants had a college degree, 29% held a master's or other advanced degree, and 16% reported having a high school diploma and one-way ANOVAs revealed no significant differences between those three groups in either aerobic,  $F(2, 121) = .17$ , *ns*, or muscle strengthening,  $F(2, 120) = .15$ , *ns*, physical activity.

### **Impact of the Eight Domains on Physical Activity**

Table 1 shows the mean impact scores for variables in each of the eight domains assessed in this study, as well as the corresponding descriptive labels on the 9-point rating scale (-4 to +4) where each domain mean impact score was located (rounded to the nearest .05). For example, the Psychological domain mean impact score of 2.66 fell between the +2 (Increases Activity Moderately) and +3 (Increases Activity A Lot) points on the rating scale. The MANOVA revealed that there were significant differences in the extent to which variables in the eight domains served to increase participants' physical activity levels, Wilks'  $\Lambda = .12$ ,  $F(89) = 90.60$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilks'  $\Lambda$  was very strong, .88.

Follow-up pairwise comparisons were conducted to determine which of the eight domains impacted physical activity more strongly than which other domains. Consistent with hypothesis, the results indicated that the variables in the Psychological domain were rated as increasing physical activity significantly more than the variables in all seven other domains, with  $t$ -test values ranging from 9.23 (Psychological vs. Social) to 25.99 (Psychological vs. Other Policy/Global) and all  $p$  values  $< .001$ . The Behavioral and Social domain impact scores were not significantly different from each other,  $t(148) = .46$ ,  $ns$ , but both were rated as significantly more impactful than the Built Environment, Natural Environment, Other Policy/Global, Demographic, and Physical domains with  $t$ -test values ranging from 4.40 (Behavioral vs. Natural Environment) to 14.36 (Social vs. Other Policy/Global) and all  $p$  values  $< .001$ . Similarly, the Built Environment and Natural Environment domain impact scores were not significantly different from each other,  $t(139) = 1.22$ ,  $ns$ , but both were rated as significantly more impactful than the Other Policy/Global, Demographic, and Physical domains with  $t$ -test values ranging from 3.94 (Natural Environment vs. Demographic) to 9.41 (Built Environment vs. Physical) and all  $p$  values  $< .001$ . Finally, Other Policy/Global and Demographic domain impact scores were not significantly different from each other,  $t(139) = .98$ ,  $ns$ , while the Other Policy/Global

domain was rated as more impactful than the Physical Domain,  $t(144) = 5.08, p < .001$ , but the Demographic domain was not,  $t(140) = 1.40, ns$ .

In order to further describe the relative impact of the variables within the eight domains on physical activity, mean impact scores separated by “Yes” and “No” responders for all 86 items (except for the demographics questions, which were separated by answer) on the Variables Impacting Physical Activity Survey were examined to determine the percentage of variables within each domain that fell within each of the different levels of impact on the 9-point rating scale. For example, in the Psychological domain the item “Do you set goals related to physical activity?” generated a mean score of +2.7 for “Yes” responders, which fell between the rating scale anchors of “Increases Moderately” and “Increases A Lot” and a mean score of -0.2 for “No” responders, which fell between the rating scale anchors of “Decreases a Little” and “No Effect.” Thus, that particular variable was counted toward the percentage of Psychological domain variables in both of those levels of impact. Table 2 displays the percentage of variables within each of the eight domains whose impact mean fell within each of the different levels of impact on the 9-point rating scale.

As seen in Table 2, from two-thirds to all of the variables in the Environmental (Built and Natural) and Other Policy/Global domains were rated by participants as decreasing their physical activity, whereas fewer than one-third to none of the variables in the other five domains were rated as decreasing activity. Conversely, from two-thirds to almost 90% of the variables in the Psychological, Behavioral, and Social/Interpersonal domains were rated by participants as increasing their physical activity moderately to extremely, whereas fewer than half to none of the variables in other five domains were rated as increasing activity moderately to extremely.

### **Variables Leading to Very Significantly Increased Physical Activity**

In order to identify the specific variables within the eight domains that respondents rated as having the strongest impact on increasing their physical activity descriptive statistics separated by sex and “Yes/No” responders for all 86 items (except for the demographics questions, which were separated by answer) on the rating scale were examined. Variables rated by female and male participants as increasing their physical activity “A Lot” to “Extremely” (i.e., between +3 and +4 on the 9-point scale) are presented in Table 3. Included in the table are the percentage of females and males who endorsed each item as “Yes,” and then for those who responded “Yes,” the mean rating of how much each item impacted their level of physical activity on the 9-point scale. As shown in the table all such variables were within the Psychological domain, and those six variables were endorsed as “Yes” by 98.4% to 100% of participants.

#### **Variables Leading to Moderately Increased Physical Activity**

Descriptive statistics separated by sex and “Yes/No” responders for all 86 items (except for the demographics questions, which were separated by answer) on the rating scale were also examined to identify the specific variables within the eight domains that respondents rated as having a moderate impact on increasing their physical activity. Table 4 displays the variables rated by female and male participants as increasing their physical activity “Moderately” to “A lot” (i.e., between +2 and +3 on the 9-point scale). Included in the table are the percentage of females and males who endorsed each item as “Yes,” and then for those who responded “Yes,” the mean rating of how much each item impacted their level of physical activity on the 9-point scale. As seen in the table, variables within the Psychological, Behavioral, Social/Interpersonal, Built Environment, and Other Policy/Global domains were rated in this range by participants, whereas variables within the Physical/Biological, Natural Environment, and Demographic domains were not. The percentage of participants who endorsed each item as “Yes” was quite variable, ranging from 12.5% to 100%.

### **Variables Leading to Decreased Physical Activity**

Finally, descriptive statistics separated by sex and “Yes/No” responders for all 86 items (except for the demographics questions, which were separated by answer) on the rating scale were examined to identify specific variables that were rated by females or males as decreasing their physical activity. Because our sample was, by definition, highly physically active, the magnitude of the mean impact scores for items that decreased physical activity were much smaller overall than those for items that increased physical activity, thus all variables rated by participants as decreasing their physical activity to any extent (i.e., below 0 on the 9-point scale) are displayed in Table 5. It should also be noted that, for consistency of presentation, the wording of some items in Table 5 was changed slightly. For example, the survey item “Do you set goals related to physical activity?” was changed in Table 5 to read “Do not set goals related to physical activity?” so that the percentage responding “Yes” could be presented for each item. As shown in the table all domains except Demographics contained variables that participants reported as decreasing their level of physical activity. As expected within a physically active sample, the percentage of “Yes” responses tended to be lower overall here and ranged from 1.8% to 87.7%.

### **DISCUSSION**

The purpose of this study was to gain insight from a criterion sample of highly physically active adults in order to identify which of the variables associated with physical activity in previous research actually help these individuals maintain an adequate level of activity in adulthood. The study revealed some interesting results and sheds light on variables that may serve as important barriers or facilitators to being physically active throughout adulthood.

Given the high physical activity levels of the sample, it is important to attend to the variables that were rated as decreasing physical activity, as such factors may have an even more

detrimental effect on those who are less active or who are struggling to become more active. Results suggested that environmental and systems level variables can serve to decrease the activity levels of even people who are engaged in a highly physically active lifestyle. Lack of convenient access to exercise facilities, naturally pleasant parks, safe places to walk and bike, traffic, crime, financial hardship, weather, and a perceived lack of support for physical activity by the government and media were all rated as decreasing physical activity by either females or males. Previous studies have yielded mixed results for the impact of those variables on physical activity with the exception of weather/season.<sup>8,12</sup> The present results suggest they are all potentially important and provide support for the public health perspective that environmental and systems level factors should be proactively addressed by communities in order to remove potential barriers to physical activity for their populations.

Fortunately, most of the factors that participants in this study identified as decreasing their activity levels can be addressed in a relatively straightforward manner, albeit not without some investment. Providing safe and pleasant public spaces to walk, bike, and engage in other forms of physical activity that are accessible to everyone, including those with physical limitations or disabilities, and that are not cost-prohibitive should be the norm in all communities if we truly want to provide the necessary environment to support physically active lifestyles. In addition, because bad weather has consistently been found to decrease physical activity, there is a clear need for communities to provide convenient public access to indoor spaces where physical activity can occur year round.

Whereas environmental and systems level variables disproportionately emerged as factors that decrease physical activity, it is important to note that they played a far smaller role in increasing physical activity with only the variables of convenient access to parks and facilities or job demands that include physical activity rated as increasing activity moderately or more. Thus,



environmental and systems level variables may be best conceptualized as being necessary, but not sufficient, for helping people achieve and maintain adequate physical activity in adulthood. Communities that provide an environment that supports physical activity can effectively remove potential barriers that decrease physical activity, but getting individuals to actually be active in that environment is dependent on specific behavior by individuals. Thus, significantly increasing the proportion of adults who are physically active will likely also require attending to intrapersonal and interpersonal variables.

Indeed, the results of this study revealed that psychological, behavioral, and social/interpersonal factors were rated as much more likely to meaningfully increase physical activity than were environmental or systems level variables. Interestingly, participants rated only psychological variables as increasing physical activity “a lot” to “extremely.” Those variables - getting physical and mental health benefits from physical activity, valuing physical activity as part of one’s life, thinking physical activity is important, planning to engage in physical activity, and enjoying engaging in physical activity - are relatively consistent with previous studies<sup>8,12,15</sup> and highlight the importance of encouraging individuals to engage in physical activities that they actually enjoy, that make them feel better mentally and physically, and that are a positive and valued part of their life. People who don’t believe physical activity is important, or who force themselves to engage in physical activities they don’t enjoy and have negative physical and emotional experiences when doing so will likely be much less inspired to achieve and maintain a high level of physical activity over time.

Some other psychological and interpersonal variables that were identified in this study as increasing physical activity moderately or more were also relatively consistent with previous work. In the interpersonal domain these included having friends and family who support being physically active.<sup>8,13,17</sup> In the psychological domain these included self-efficacy, motivation,

perceived fitness, identity, and having an internal locus of control.<sup>8,13,14,28</sup> Having a workout partner was also rated as increasing physical activity by participants in this study and may be particularly salient for women as 59% endorsed having a workout partner in comparison to only 25.5% of males.

Despite those consistencies, this study also revealed some novel and surprising results. Interestingly, demographic factors such as age, gender, ethnicity, educational level, and community type which have been linked with activity status in previous studies<sup>8,9,13,14</sup> were not rated by participants as having a significant impact on their level of physical activity. Importantly, analyses revealed this to be true for all of those demographic variables. Although those findings were likely influenced by restricting our sample to adequately physically active adults, they suggest that demographic factors should certainly not be viewed as barriers to maintaining a physically active lifestyle. The one possible exception to that may be income. Though income was not actually correlated with activity levels, cost/finances was rated by the participants as one of the variables that decreased their physical activity in this study.

Perceived effort and mental health problems have both been linked with inactivity in previous studies,<sup>8</sup> but participants in the current study actually rated those variables as increasing their physical activity somewhat. In contrast to previous work<sup>8</sup> this study also revealed that dissatisfaction with body image was associated with increased, rather than decreased physical activity. Whereas stress has not been positively associated with physical activity in previous studies,<sup>8,9,14,15</sup> over 96% of both male and female participants in this study reported using physical activity as a way to reduce stress, and that having a high level of job or overall life stress actually increased their physical activity moderately to a lot. These results suggest that encouraging individuals to use physical activity as a way to cope with and reduce stress and negative affect may help them increase their activity levels. Also in contrast to previous work,<sup>29</sup>

being physically active in childhood and youth was reported as positively impacting current adult activity in the present study, as was participation in recreational or competitive sports in youth and emerging adulthood. Those findings suggest that communities and schools should consider ensuring that they provide accessible and low-cost organized sports and other physical activity programming. Unfortunately, many schools, including colleges, have significantly decreased physical activity offerings and requirements over the past few decades<sup>30</sup> potentially increasing the number of individuals at risk for inactivity in adulthood.

### **Limitations**

The study sample had a higher than average income and educational level, a higher proportion of Asian-American and European-American participants and lower proportion of African-American and Latino/a participants, and was disproportionately female when compared to the United States population. Another limitation is the self-report methodology used, which measured participants' perceived impact of the variables assessed on their physical activity as opposed to the actual impact of those variables, thus introducing the possibility of self-report bias influencing the results. Relatedly, the measures used were created for this study and have not been psychometrically evaluated to determine the extent to which they are reliable and valid. Despite those limitations, this study revealed some interesting results that provide insight into the variables that active individuals believe help them maintain a physically active lifestyle in adulthood.

### **TRANSLATION TO HEALTH EDUCATION PRACTICE**

Consistent with ecological models of physical activity, the results of this study suggest that a comprehensive approach is needed to address the widespread and serious problem of physical inactivity. From a public health perspective it appears that communities can play an important role in erecting or removing potential barriers to physical activity for individuals. If we

truly want more adults to be physically active, communities must develop and maintain an environment that supports physical activity. Such an environment should include safe and pleasant places for people to walk, bike, and recreate. Furthermore, recreation facilities and parks need to be convenient and accessible to all individuals no matter their age, income level, background, or ability status and they should ideally provide opportunities for people to be physically active no matter the weather. The lack of an environment possessing those characteristics can clearly decrease physical activity levels, even for those who are inclined to be active.

Whereas policies and infrastructure likely play a critical role in removing potential barriers to physical activity, it is unlikely that addressing such variables will be sufficient to increase the proportion of individuals who are able to achieve and maintain adequate levels of physical activity in adulthood. Indeed, the environmental factors noted above along with encouragement from schools, workplaces, government policies, physicians, media, and marketing campaigns designed to promote physical activity were not perceived by participants in this study as significantly increasing their physical activity. Rather, participants attributed their high activity levels primarily to psychological, behavioral, and interpersonal factors. Whereas some of these impactful variables are not amenable to systems level interventions (e.g., having family members support physical activity), some are (e.g., exposure to recreational and competitive sports throughout childhood and youth) and should be targeted. In addition, many of the variables rated by participants as impacting their physical activity significantly are indeed amenable to individual and group level interventions by health professionals. At the very least, policy makers, educators, and health professionals should be aware of the variables identified in this and other studies as having the greatest promise to significantly increase physical activity levels. Ideally, that knowledge can be used to guide policy, as well as direct work with

individuals, who would like to be more active, so that more people are able to achieve and maintain an adequate level of physical activity throughout their life.

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