

Relationship between levels of physical activity and quality of life in drug use in teenagers

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Due to the increasing drug use among teenagers, this study aimed to evaluate the actual contribution of physical activities as a method of preventing drug use, considering the quality of life indices and patterns of consumption of these substances. The study was conducted with 754 teenagers between 14 and 18 years old. High consumption rates of psychotropic substances, energy drinks, ergogenic substances and low levels of quality of life were found among teenagers with high levels of physical activity. In general, carrying out educational interventions on substance use in general is suggested, for teenagers who practice physical activity, their families and coaches.

Descriptors: Adolescent; Motor Activity, Quality of Life, Substance, Related Disorders.

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Relação entre os níveis de atividade física e qualidade de vida no uso de drogas em adolescentes

Devido ao crescente consumo de drogas entre os adolescentes em fase escolar, este estudo teve por objetivo avaliar a real contribuição das atividades físicas como método de prevenção ao uso de entorpecentes, considerando os índices de qualidade de vida e padrões de consumo dessas substâncias. O estudo foi realizado com 754 adolescentes entre 14 e 18 anos de idade. Verificou-se, entre os adolescentes com alto nível de atividade física, maiores índices de consumo de substâncias psicotrópicas, bebidas energéticas, substâncias ergogênicas e baixos índices de qualidade de vida. De modo geral, sugere-se a realização de intervenções de caráter educativo sobre o uso de substâncias em geral, tanto para adolescentes praticantes de atividades físicas quanto para familiares e treinadores.

Descritores: Adolescente; Atividade Motora; Qualidade de Vida; Transtornos Relacionados ao Uso de Substâncias.

Relación entre los niveles de actividad física y calidad de vida en el uso de drogas en adolescentes

Debido al creciente consumo de drogas entre los adolescentes en fase escolar, este estudio tuvo por objetivo evaluar la real contribución de las actividades físicas como método de prevención al uso de drogas, considerando los índices de calidad de vida y calidades de consumo de esas sustancias. El estudio fue realizado con 754 adolescentes entre 14 y 18 años de edad. Se verificó, entre los adolescentes con alto nivel de actividad física, mayores índices de consumo de sustancias psicotrópicas, bebidas energéticas, sustancias ergogênicas y bajos índices de calidad de vida. De modo general, se sugiere la realización de intervenciones de carácter educativo sobre el uso de sustancias en general, tanto para adolescentes practicantes de actividades físicas cuanto para familiares y entrenadores.

Descriptorios: Adolescentes; Actividad Motora; Calidad de Vida; Trastornos Relacionados con Sustancias.

Introduction

In the 1990s, practicing physical activity by the population has become a matter of health and for that reason many studies emphasize the importance of exercise from childhood to build an adult life with healthy habits⁽¹⁾. In adolescence, in addition to good

nutrition, physical activity is an important contribution to the improvement and development of individuals and can improve the physical potential for a better use of their possibilities, as well as to decrease the risks of future diseases⁽²⁾.

In general, the major concern with body image is the propellant stimulation that leads many teenagers

to pursue sports activities. The interest in health promotion is the secondary reason teenagers seek physical activity in gyms, clubs and other places⁽³⁾. Sport, seen as only or main teenager activity, can cause losses due to unreasonable pressure against an exaggerated physical exertion, causing anxiety resulting from competition and training, which can take them to an imbalance in relation to their physical, emotional and social satisfaction⁽⁴⁾.

There are two trends regarding the conceptualization of the term quality of life in health: quality of life as a more generic concept and quality of life related to health⁽⁵⁾. Perceived health is called "Health-Related Quality of Life" (HRQOL) and is described as a construct that encompasses components of well-being and physical, emotional, mental, social and behavioral functions, as perceived by individuals themselves and by others. Ravens-Sieberer and the European group KIDSCREEN⁽⁶⁾ argue that the conceptualization of health-related quality of life implies a comprehensive model of subjective and multidimensional health. The authors state that health-related quality of life can be seen as a psychological construct that describes physical, psychological, mental, social and functional well-being.

Regarding the association between quality of life and substance use, particularly in adolescence, studies indicate that drug use by parents or relatives, low perception of parental support, absence of religious practice and lower frequency of physical activities physical provide low levels of quality of life and therefore increase the incidence of risk factors related to use of psychotropic substances and other risk behaviors⁽⁷⁾.

As for the adoption of better lifestyle, studies of North American teenagers showed that moderate levels of physical activity were associated with a lower incidence of tobacco and cannabis use, suggesting positive psychosocial effects in this age group⁽⁸⁾. On the other hand, Dearwater *et al.*,⁽⁹⁾ evaluated the association between quality of life and risk behaviors in male teenagers and found higher incidence of alcohol consumption among those with higher levels of physical activity and sport. Other studies with similar results also showed that physical and sporting activities not necessarily act as a protective factor for substance use⁽¹⁰⁾.

Thus, this study aimed to investigate the relationship between different levels of physical

activity, quality of life and psychotropic substances among students in public schools, analyzing the actual contribution of sports as a strategy to prevent drug use.

Material and Methods

This study included 754 students aged between 14 and 18 years, of both genders, attending the 9th grade of elementary school and 3rd year of high school from 4 public schools in the city of Guarulhos, São Paulo, selected by convenience criteria and sociodemographic pairing.

After the initial contact with the selected schools the study was presented to the direction of each unit, the Free and Clarified Consent Term was signed and days and times to apply the questionnaires to students were scheduled. The classes were selected by convenience criteria and the students were volunteers. The questionnaires were applied in the classrooms, with the presence of the teacher and researchers affiliated with this study, for 50 minutes. When the application was finished an informative lecture that addressed issues related to quality of life, sports practices and use of licit and illicit drugs, including energy and ergogenic drinks was offered in the schools.

To evaluate the level of physical activity (PA) in different contexts of individual life, the International Physical Activity Questionnaire (IPAQ) was used, developed by the World Health organization and validated for the Brazilian population⁽¹¹⁾. The long version of the questionnaire was applied, composed of 27 questions divided into five areas: PA at Work; PA in Locomotion; PA Domestic; Leisure Activities; and Sitting Time spent during the week and weekend.

Based on the information provided through the IPAQ, score of metabolic equivalent of task (MET) was employed for each type of PA performed of the five areas assessed, which was multiplied by the weekly frequency (Days or weeks) and by the average time of activities. Subsequently, the total of each area was added and the total PA was calculated in METs per week⁽¹²⁾. Metabolic equivalent of task (MET) is a unit used to estimate the metabolic expenditure of physical activity, based on oxygen consumption. One MET is equivalent to resting metabolic rate of approximately 3.5 ml O₂ per minute. When expressing the energy spent in METs, it is represented the number of times

by which the resting metabolism was multiplied during an activity. The American College of Sport Medicine suggests that the MET unit is used as a method to display and compare the absolute intensity and energy expenditure of different physical activities. In this context, the concept of MET is applied in the guidelines to the population in relation to the energy expenditure of activities. Therefore, MET is a measure of exercise intensity⁽¹³⁻¹⁴⁾. As a result, participants were classified into three different levels of physical activity intensity: *Low*: Individuals who have not reached PA levels suitable to be included in categories two and three (Below); *Moderate*: Individuals with intense PA practice of 3 or more days per week for more than 20 minutes/day; or individuals who practice moderate PA or walking in 5 or more days per week for more than 30 minutes/day; or individuals who practice combinations of intense and moderate exercises in 5 or more days a week for more than 30 minutes/day, reaching at least 600 METs per week. *High*: Individuals who practice intense PA in 3 or more days a week, reaching 1500 METs in a week; or individuals who practice any combination of PA intense and moderate in 7 days a week, reaching at least 3,000 METs per week.

To evaluate the Health-Related Quality of Life (HRQOL) the KIDSCREEN-52 questionnaire was used, validated for the Brazilian population⁽¹⁵⁾. This instrument provides indices of well-being and subjective health in healthy children and teenagers with chronic conditions. This study used the short version of the instrument, consisting of 27 questions related to the perception of the five dimensions of HRQOL, namely: Physical well-being; Psychological well-being; Autonomy and relationships with parents; Friends and social support; School environment. Responses are formatted by size, in Likert scale from one to five points in order to identify frequency or intensity of feelings, retroactive to the week before the questionnaire. The indices in each dimension are computed considering the responses of the group of questions that make up this dimension and equally considered. The final scores equivalent to each dimension are recorded on a measurement scale, ranging from zero to 100, zero being the lowest and 100 the highest perception of the HRQOL indicator of the size in question.

To evaluate substance use the Drug Use Screening Inventory (DUSI) was used, validated for the population of Brazilian teenagers⁽¹⁶⁾. This study used

only the table of substance use of the last month, and area 1 consists of 15 questions addressing problems associated with the use, for example: compulsion in use, symptoms of tolerance, withdrawal, or involvement in accidents under effect of alcohol and/or other drugs. In order to investigate the consumption of energy drinks and ergogenic substances, used in order to improve sports performance and/or recovery after exercise, these substances were added to the list of those substances originally assessed by the instrument (Area 1). The issues of DUSI (Area 1) are answered with Yes or No, and affirmative responses mean the presence of problems. To classify substance use pattern of the participants the same cutoff points proposed during the DUSI validation were adopted, namely: zero to two affirmative responses in substance use area is equivalent to experimental use; three to seven affirmative responses mean abuse use and more than seven affirmative responses correspond to dependence on evidence. Thus, participants who did not score in the substance use area (Area 1) and who did not mention substance use in the last month were classified as "Non-Users." To classify "Experimental Users" the consumption of alcohol and/or tobacco was considered at the maximum frequency of one to two times a month and/or up to two affirmative responses in the substance use area. To classify "Abusive Users" the maximum consumption of alcohol and/or tobacco was considered as up to nine times in the last month; and/or maximum use of illicit substances of up to nine times in the last month; and/or three to seven positive responses in the substance use area. To classify dependence, the consumption of alcohol and/or tobacco was considered as higher than 20 times in the last month; and/or illicit substances consumption more than 10 times in the last month; and/or seven or more positive responses in the substance use area.

This study was submitted to the Ethics Committee of the Federal University of São Paulo (Nº. 534,640) for approval, and received the Presentation Certificate for Ethics Assessment (CAAE) (Nº.21956613.6.0000.5505).

The SPSS software version 20.0 was used to perform the statistical analysis. Descriptive statistics and statistical hypothesis were made. Continuous variables were expressed as mean and standard deviation and categorical variables were expressed as absolute and relative frequency. The comparison between groups was performed using the Student *t*

test for continuous variables and the chi-square test was used for categorical variables. The significance level used in all tests was equal to 0.05.

Results

With regard to demographic data there were no differences between groups. The average age of participants was 15.5 years, slightly more than half of the sample was female (54.5%) and were enrolled in the first grade of high school (57%). Considering

the levels of physical activity, the highest percentage of girls in the moderate intensity group stands out when compared to boys. It was observed that 3.5% of the sample declared some disability (Locomotor or cardiorespiratory) considered an impediment to perform PA conventionally. However, assuming that the schools participating in this study have PA adapted to individuals with special needs, these were not excluded. It is worth mentioning that this percentage of disability represents only 10% of low level physical activity group (Table 1).

Table 1 - Socio-demographic data of the sample considering the groups on the level of physical activity (n=754). Guarulhos, SP, Brazil, 2014/2015. Data expressed in percentage.

| | Low (n=247) | Moderate (n=387) | High (n=120) | F/X2 | p. |
|---------------------|----------------|---------------------|-----------------|-------|------|
| Age | | | | 0.00 | 0.99 |
| Mean± SD | 15.5 ± 0.83 | 15.5 ± 0.89 | 15.6 ± 0.74 | | |
| Gender | | | | 8.62 | 0.01 |
| Male | 51.0 (N=126) | 40.0 (N=155) | 50.0 (N=60) | | |
| Female | 49.0(N=121) | 60.0 (N=232) | 50.0 (N=60) | | |
| Grade | | | | 18.48 | 0.01 |
| Ninth Year | 16.6 (N=41) | 21.7 (N=84) | 12.5 (N=15) | | |
| High school I | 63.2 (N=156) | 52.2 (N=202) | 50.3 (N=60) | | |
| High school II | 14.6 (N=36) | 18.9 (N=73) | 25.8 (N=31) | | |
| High school III | 5.6 (N=14) | 7.2 (N=28) | 11.4 (N=14) | | |
| Repetition | | | | 3.85 | 0.14 |
| Yes | 27.9 (N=69) | 21.7 (N=84) | 20.8 (N=25) | | |
| No | 72.1 (N=178) | 78.3 (N=303) | 79.2 (N=95) | | |
| Physical disability | | | | 1.57 | 0.45 |
| Yes | 4.0 (N=10) | 3.6 (N=14) | 1.7 (N=2) | | |
| No | 96.0 (N=227) | 96.4 (N=373) | 98.3 (N=118) | | |

As for the quality of life indices, teenagers of high intensity physical activity group had worse quality of life levels (Represented by lower means) in the dimensions related to autonomy or relationship

with parents, friends, social support and school performance when compared to teenagers from the other groups (Table 2).

Table 2 - Association between indices of Quality of Life (QOL) and physical activity of teenagers (n=754). Guarulhos, SP, Brazil, 2014/2015.

| QOL levels | Low (n=247) | Moderate (n=287) | High (n=120) |
|--------------------------|----------------|---------------------|-----------------|
| | Mean ± SD | Mean ± SD | Mean ± SD |
| Physical well-being | 61.0 ± 14.5 | 63.5 ± 12.2 | 62.8 ± 14.8 |
| Psychological well-being | 62.5 ± 12.0 | 64.5 ± 9.8 | 63.4 ± 12.5 |

(continue...)

Table 2 - (continuation)

| QOL levels | Low (n=247) | Moderate (n=287) | High (n=120) |
|-----------------------------------|----------------|---------------------|-----------------|
| | Mean ± SD | Mean ± SD | Mean ± SD |
| Autonomy or relation with parents | 69.0 a ± 19.9 | 65.0 a ± 20.6 | 59.5 ± 20.6 b |
| Friends or social support | 74.5 a ± 21.0 | 74.0 a ± 20.4 | 69.5 ± 18.9b |
| School environment | 65.0 ± 20.0 | 67.0 ± 19.8 | 59.0 ± 21.5b |

SD: standard deviation; a differs significantly from the high level group ($p < 0.05$) *t-student Test*. b differs significantly from low to moderate level group ($p < 0.05$) *t-student Test*.

Table 3 presents data on the pattern of consumption of substances in the last month by the 3 groups. There were a significantly higher percentage of non-users of substances between the low physical activity group (70%), and a significantly higher

percentage of dependents in the high physical activity group (16%). There were no significant differences between consumption and gender patterns between the groups.

Table 3 - Consumption pattern of substances used by teenagers, considering gender and level of physical activity. Data expressed in percentage (n=754). Guarulhos, SP, Brazil, 2014/2015.

| Consumption pattern | Low ^a (n=247) | | Moderate ^b (n=287) | | High ^c (n=120) | |
|---------------------|-----------------------------|-----------|----------------------------------|-----------|------------------------------|-----------|
| | Man | Woman | Man | Woman | Man | Woman |
| Non-user | 34 (N=84) | 36 (N=89) | 21 (N=60) | 32 (N=92) | 21 (N=25) | 23 (N=28) |
| Experimental use | 10 (N=24) | 10 (N=24) | 12 (N=34) | 18 (N=52) | 19 (N=23) | 13 (N=17) |
| Abusive use | 4 (N=10) | 4 (N=10) | 5 (N=15) | 8 (N=22) | 2 (N=2) | 6 (N=7) |
| Dependents | 2 (N=6) | 0 (N=0) | 2 (N=6) | 2 (N=6) | 8 (N=9) | 8 (N=9) |

a = $X^2 = 6.1$; $p = 0.1$; b = $X^2 = 0.5$; $p = 0.9$; c = $X^2 = 3.8$; $p = 0.2$.

Table 4 presents the consumption of drugs in the last month among the three groups, considering the genre. Higher percentage of use of the evaluated substances (Except cocaine or crack) among teenagers of high intensity physical activity group was observed (With higher consumption among boys), compared to the other groups. The moderate physical activity group differed from the low intensity group,

with a higher percentage of energetic and tobacco users. Regarding gender, a higher percentage of boys of high intensity group had alcohol beverages; higher percentage of boys of moderate and low intensity group making use of energetic drinks and a higher percentage of girls in the moderate intensity group using tobacco.

Table 4 - Relationship between consumption of psychotropic substances in the last month and level of physical activity, considering gender. Values expressed in percentage (n=754). Guarulhos, SP, Brazil, 2014/2015.

| Substance | Low (N=247) | | | Moderate (N=287) | | | High (N=120) | | |
|-----------|----------------|------|-----------|---------------------|-------|-----------|-----------------|-------|-----------|
| | M | W | Total (%) | M | W | Total (%) | M | W | Total (%) |
| Energetic | 45.2a | 27.0 | 36 | 60.0a b | 52 | 55b | 56,5 | 55.0a | 56a |
| Alcohol | 36.5 | 28.0 | 32 | 45.5 | 41.5 | 43d | 66.5abc | 50,0 | 58d |
| Tobacco | 15.0 | 11.5 | 13 | 16.0 | 26.5a | 22b | 26.5 bc | 25.0b | 26b |

(continue...)

Table 4 - (continuation)

| Substance | Low (N=247) | | | Moderate (N=287) | | | High (N=120) | | |
|-----------------------|----------------|------|--------------|---------------------|-----|--------------|--------------------|--------------------|------------------|
| | M | W | Total (%) | M | W | Total (%) | M | W | Total (%) |
| Cannabis | 11.0 | 11.5 | 7 | 11.5 | 9.0 | 10 | 16.5 | 17.0 ^b | 17 ^{bc} |
| Inhalants or solvents | 2.5 | 1.5 | 2 | 8.0 | 9.0 | 8 | 15.0 ^{bc} | 17.0 ^{bc} | 16 ^{bc} |
| Ergogenic | 2.5 | 0.8 | 2 | 7.5 | 4.0 | 5 | 13.5 ^{bc} | 11.5 ^{bc} | 12 ^{bc} |
| Cocaine or Crack | 0.8 | 0 | 0.4 | 3.0 | 0 | 1 | 2.5 | 8.5 ^{bc} | 6 ^{bc} |

^a differs from the opposite gender in the same category;

^b differs significantly from the low level group ($p < 0.05$);

^c differs significantly from the moderate level group ($p < 0.05$);

^d differs from the other groups ($p < 0.05$);

Discussion

This study aimed to bring the issue to reflection and evaluate the actual contribution of physical activities practice as a method of preventing drug use, considering the levels of quality of life, consumption patterns and types of substances consumed. It is known that for a large part of teenagers the entrance into puberty and adolescence is a source of anguish and worries about body image. For this reason the search for physical activities at this stage, regardless of gender, tends to grow and is intended to improve or change in physical appearance⁽¹⁷⁾, which may explain, at least in part, higher percentage of girls present in the moderate physical activity group.

This search for an aesthetically perfect body has led many teenagers to use abusive and inappropriate substances precociously, with believe that these substances quickly provide aesthetic change. Among these substances the ergogenic is highlighted, with consumption considerably increased between teenagers who practice physical activities⁽¹⁸⁾ which, in this study, were significantly more consumed by boys.

It can be inferred that the high consumption of ergogenic substances is because of the industry constantly launching products with promises of immediate and miraculous effects, associated with the absence of strict legislation, which allows the commercialization without a prescription. This dissatisfaction with their own image can induce teenagers to pursue physical activities at high intensity not only for competitive purposes but also as

a appreciation of the body and appearance, often to be achieved at any cost.

In this regard, it is worth mentioning that many ergogenic induce burning of amino acids, which can cause high levels of ketosis, acidity and ammonia, which in the long run, can lead to renal overload, dehydration and cardiovascular diseases⁽¹⁹⁾. In this study, 12% of teenagers in the group with high levels of physical activity, on average 15 years old, made use of these substances in the 30 days prior to data collection. It can be inferred that due to high amount of physical activity performed by those teenagers, this consumption could have been suggested by a coach or colleague who has used it. This shows the urgent need to disseminate information about the danger of these substances use, particularly in adolescence.

Similarly worrying has been the high consumption of energy drinks not only in recreational but also in the sporting context. Due to replenishing metabolism function they are generally considered beneficial and devoid of any harm, justifying their uncontrolled consumption⁽¹⁴⁾.

In this study, significant number of teenagers who used energy drinks (Low, 36%; Moderate, 55%; and High, 56%), most likely hoped to achieve better performance in sports. However, little is known about the effect of energetic consumption both in increase of sports performance as in increase of physical capacity such as aerobic endurance, speed, strength and muscle power⁽²⁰⁾.

Another important factor observed in this study refers to the practice of physical activity and quality

of life of teenagers. The World Health Organization refers to physical activity and sports in general as essential to the health and well-being of the human being⁽²¹⁾. From this perspective, many people began to devote themselves to sports beyond levels considered beneficial. In this sense, many parents, trying to offer a differentiated quality of life for their children, end up exposing them to increased levels of physical activity, affecting their social, family and academic aspects⁽²²⁾.

In this study it was observed that the teenagers group with high levels of physical activity had significantly lower levels of quality of life in the following areas: autonomy or relationship with parents, sociability or relationship with friends and school performance. In other words, because these teenagers were too involved with sports, several areas of their lives were being compromised. It is known that young people whose involvement with sports reaches intense levels, generally, participate in national and international competitions and, therefore, dedicate themselves to more rigorous and frequent training. Thus, these young people end up having higher absenteeism levels at school, culminating in lower academic performance, lower sociability (Because they do not develop friendship bonds), lower autonomy and relationship with parents (Since they are always involved in training and traveling)⁽²³⁾.

As for the relationship between physical activity and drug use, it is noteworthy that for a long time, physical or sport activity was overmuch considered preventive of drug use⁽²²⁾. In this study, it was observed that, unlike common sense, the teenagers of the high physical activity level group had high intake of various substances (alcohol, inhalants, cannabis, tobacco, energetic and ergogenic). Similarly, some authors evaluated the relationship between sports practice and consumption of alcohol or tobacco of 13,872 students between 14 and 18 years old of the 27 Brazilian capitals, and found significantly higher rates of alcohol consumption among students who regularly practiced sports, such as gymnastics, soccer and weight lifting⁽²⁴⁾. Analogous to these findings, a study with regular college athletes found that 13% had used cannabis prior to physical activities, in order to increase performance⁽¹⁰⁾. This shows that the physical or sport activities cannot be considered a primarily protective

factor for drug use, as stated generally. Nor can it be said that low levels of physical or sport activities or lack thereof represent a risk factor for substance use.

An unexpected data, but important, refers to the percentage (70%) of “non-users” among teenagers from the low physical activity group. Thus, possibly, the quality of life related to family dimension, perceived by the teenagers and represented by the interaction between them and their parents, just as their feelings of belonging and being loved in the family, is the predominant aspect to explain high percentage of these “non-users” acting as a protective factor for drug use. Furthermore, as many of these teenagers go through difficulties at school, greater and better understanding of substance use by educators could strengthen protection against the use⁽²⁵⁾. In addition, it can be observed that the absence of physical activities or low level of practice little represented to the “no drug use” outcome when compared to the variables related to quality of life with family and friends.

Final Remarks

Given the outcomes of this study on family, social and school quality of life of teenagers, there are concerns about the impact that intense sporting activities have on their quality of life. It was found that the existing articles on quality of life of teenagers or young athletes approach the theme in the broad sense, reinforcing the importance of sports practice in the general quality of life. However, there are no studies on the impact of physical and sport activity in specific dimensions of quality of life in teenagers such as performed in this study.

In short, regarded by society as a theme always associated with positive effects, physical activity as a method of preventing substance use has become a little challenged statement, even in academic areas. Thus, its actual contribution as a preventive method, particularly in adolescence, needs to be rethought. This study has some limitations: a) Sample not representative of the population of teenagers; b) IPAQ provides the physical activity levels, but does not assess different sports.

The outcomes in this study suggest an association between the intensity level of physical activity and drug

use, and in no event establishes causality between the facts. Thus, the urgent need to implement systematic prevention programs is suggested, specifically for teenagers, aimed at preventing the use of substances in general, together with the provision of information to trainers and coaches about the use of energy drinks and ergogenic substances. At the same time, it is inevitable to reflect on ways to warn parents - relatives or guardians, about the impact that high levels of sport intensity may result in the teenagers' life, particularly in relation to quality of life relative to family, social and academic relationships. Obviously, there is no intention to neither restrict nor inhibit competitive sports practice among teenagers. Instead, alerting responsible persons (Coaches and family members) is proposed, so that they are aware of the different spheres of the teenagers' life, which should be prioritized as well as sport practice.

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