Healthy lifestyles and academic success in a sample of Italian university students

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Abstract

Scientific literature has shown that healthy lifestyles are implicated both in the reduction of the risk of several disorders and to the improvement of cognitive functions. The present study evaluated the association between lifestyle behaviours and academic performance in 466 university students (26.5% males) from 12 different degree courses of the University of Palermo (Italy). Our hypothesis was that healthy lifestyles, measured as practice of a good diet, satisfying quality of sleep, low stress levels, perceived social support, abstention from the use of illegal drugs, non-problematic internet use and a regular sport habits, were associated to academic success. Our results showed that academic success is positively correlated with perceived social support and negatively with Internet use. No significant correlation between academic success and perceived stress was found as well as with amount of sleep hours. The data also indicated that lower academic success is associated with use of illegal drugs and physical inactivity. This survey focuses the attention on the relevance of promoting health-related behaviours not only to reduce the risk of illness but also to increase the possibility of achieving life goals successfully.

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3 Abstract

Scientific literature has shown that healthy lifestyles are implicated both in the risk reduction 4 of several disorders and in the improvement of cognitive functions. The present study evaluated the 5 association between lifestyle behaviors and academic performance in university students from 6 7 twelve different degree courses at the University of Palermo, Italy. It was hypothesized that healthy lifestyles, measured as the practice of a good diet, satisfying quality of sleep, low-stress levels, 8 9 perceived social support, abstention from the use of illegal drugs, non-problematic Internet use, and regular sports habits, were associated to academic success. A total of 466 students were surveyed 10 (26.5% males). The results showed that academic success is positively correlated with perceived 11 12 social support and negatively correlated with the level of Internet addiction. There was no correlation between academic success and perceived stress as well as with the amount of sleep 13 14 hours. The data also indicated that students with a low CGPA were more likely to report use of illegal drugs and physical inactivity compared to students with high CGPA. This study focuses the 15 attention on the relevance of promoting health-related behaviors not only to reduce the risk of 16 illness but also to successfully increase the possibility of achieving life goals. 17

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19 Keywords: Healthy behaviors; Academic success; School psychology; Health psychology

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21 Introduction

22 The university years are an essential phase of a student's life in which significant shifts in individual experience lead to transformations in lifestyle and social relationships. It is also a critical 23 24 period in which students lay the foundations of their later careers. Scientific literature has shown that academic performance is a strong predictor of future career success and income, which are 25 26 strictly related to quality of life, wellness and health (Mikkonen & Raphael, 2010; Ross & Wu, 27 1995; Tan, 1991; Wald, Muennig, O'Connell, & Garber, 2014; Woolf, 2007). Furthermore, healthy 28 lifestyle behaviors are important for supporting health and well-being (McIsaac, Kirk, & Kuhle, 2015). There is also evidence that an individual's lifestyle is strictly connected with level of 29 30 education (Suhrcke & De Paz Nieves, 2011). Traditionally, the main variables associated to a healthy lifestyle are the quality of nutrition, sports habits, amount and quality of sleep and use of 31 illegal drugs (Farhud, 2015) as well as stress levels and self-esteem (Hudd et al., 2000), and social 32 support (Kelly, Melnyk, Jacobson, & O'Haver, 2011). 33

Healthy nutrition habits are critical for supporting academic achievement in children 1 (Florence, Asbridge, & Veugelers, 2008; Rampersaud, Pereira, Girard, Adams, & Metzl, 2005), 2 adolescents (Correa-Burrows, Burrows, Blanco, Retes, & Gahagan, 2016; Sigfusdottir, 3 Kristjansson, & Allegrante, 2007), and young adults (Burrows, Whatnall, Patterson, & Hutchesson, 4 2017; French, Epstein, Jeffery, Blundell, & Wardle, 2012). According to Valladares and colleagues 5 (2016), female university students with a higher grade-point average (GPA) reported a greater 6 7 ability to manage their food intake and to select healthier food choices. On the other hand, an unhealthy diet including foods high in saturated fats and refined sugars can be very harmful to 8 9 cognitive processing (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2013; Francis & Stevenson, 2013). According to international guidelines, a healthy diet should be low in fat (especially animal-10 11 derived) and rich in carbohydrates (better if whole wheat), fruit and vegetables (Dalle Grave & Mangeri, 2012). Scott, De Souza, Koehler and Murray-Kolb (2016) highlighted that academic 12 13 performance is associated with optimal levels of iron in the blood in a sample of university women and therefore, the consumption of foods rich in iron would bring benefits to the learning process, to 14 15 cognitive functions, and consequently to school performance.

Another relevant variable often associated with academic performance is stress level (Elias, 16 17 Ping, & Abdullah, 2011; Melaku, Mossie, & Negash, 2015). Goldstein, Boxer and Rudolph (2015) found that higher amounts of middle school transition stress predicted lower grades and higher 18 school anxiety in a sample of 774 children. A recent review (Ribeiro et al., 2018) highlighted that 19 20 university students' quality of life was negatively associated to stress. Bergmann, Muth and Loerbroks (2019) showed that the demands associated with studies, the demands in private life and 21 lacking resources for recovery contribute to stress among medical students and reduce well-being. 22 In general, university life exposes students to high levels of stress and entails a frenetic routine; this 23 24 increases the probability of them being exposed to unhealthy options such as foods with lots of preservatives, saturated fats, and refined sugars (Francis & Stevenson, 2013). Furthermore, previous 25 26 studies revealed that stress is one of the crucial antecedents of Internet addiction for adolescents (Ah & Yeong, 2011) and college students (Yan, Li, & Sui, 2014). 27

Other variables related to cognitive performance and learning outcomes are practicing regular physical activity, sleeping well, and reducing screen-time (Curcio, Ferrara, & De Gennaro, 2006; Francis & Stevenson, 2013; Singh, Uijtdewilligen, Twisk, Van Mechelen, & Chinapaw, 2012). Several studies show that students who practice sports regularly tend to lead more balanced lifestyles and better manage the organization of their studies (Chuan, Yusof, & Shah, 2013; Gaston-Gayles & Hu, 2009; Muñoz-Bullón, Sanchez-Bueno, & Vos-Saz, 2017). Indeed, regular exercise induces a strengthening of cognitive brain functioning; thus, improving academic performance

(Hillman, Erickson, & Kramer, 2008). From several studies, it emerges that athletes usually obtain 1 2 more effective results in tests that evaluate brain performance, demonstrating greater concentration and better visual-spatial coordination (Akarsu, Calişkan, & Dane, 2009; Muiños & Ballesteros, 3 2013). This could be directly related to the neurotrophic effect of physical exercise and to the 4 stimuli elicited in numerous circuits and cortical areas (Trudeau & Shephard, 2010). Moreover, 5 physical activity improves the quality of sleep; thereby, it ensures adequate levels of concentration 6 7 during the day, facilitating an improvement in school and work performance (Loprinzi & Cardinal, 8 2011).

9 There is much evidence regarding the relationship between drug intake and low GPA (DeBerard, Spielmans, & Julka, 2004; Singleton, 2007). Aertgeerts and Buntinx (2002) found that 10 11 most of alcohol-dependent students failed in their first year of college, compared to students who did not report drinking problems. Furthermore, another recent study showed that the combined use 12 13 of cannabis and tobacco, regardless of the type of use (concurrent or simultaneous), is moderately associated with poor academic achievement amongst university students (Hernández-Serrano, Gras, 14 15 & Font-Mayolas, 2018). Moreover, a negative correlation between the level of Internet addiction and academic achievement has been recently observed both in adolescents (Seo, Park, Kim, & Park, 16 2015; Türel & Toraman, 2015) and in young adults (Akhter, 2013; Kubey, Lavin, & Barrows, 17 2001). Internet addiction (Akhter, 2013) as well as mobile phone addiction (Lepp, Barkley, & 18 Karpinski, 2014), are negatively related to academic performance. Furthermore, these variables 19 20 seem to be related to a depressed mood, low self-esteem and high aggression-hostility (Seo et al., 2015; Sideli et al., 2017). Moreover, in a sample of college-age students, Anand (2007) found that 21 22 the amount of time spent playing video games is negatively correlated to GPA. This negative relationship could be explained by considering that university students who spend more time 23 24 playing video games are inclined to spend less time reading books.

25 A substantial body of literature has shown that self-esteem, self-efficacy, social support and goal commitment are associated with a better GPA, while social distractions and psychological 26 stress are associated with poor academic performance (Richardson, Abraham, & Bond, 2012; 27 28 Rodríguez, Tinajero, & Páramo, 2017; Turner, Bartlett, Andiappan, & Cabot, 2015; Waqas et al., 2015). Faught et al. (2017) examined the combined impact of diet, physical activity, sleep and time 29 30 spent on smartphones or computers, showing that satisfaction with lifestyle choices was associated with a higher probability of fulfilling academic expectations, while no association was found 31 32 between body weight and academic performance.

Even if health-related behaviors and psychological wellness seem to play a critical role as predictors of cognitive processes and learning outcomes, the mechanism is poorly understood (Valladares et al., 2016). Furthermore, most of the studies were based on the recruitment of children
and adolescents (Adolphus, 2013; Correa-Burrows et al., 2016; Edefonti et al., 2014; Faught et al.,
2017; Kantomaa et al., 2013; Kristjansson, Sigfusdottir, & Allegrante, 2010; McIsaac et al., 2015;
Sigfusdottir et al., 2007), while, on the other hand, the literature about the relationship between
multiple variables related to lifestyle and academic performance in university students seems to be
lacking.

7 Given these premises, the present study evaluated the association between academic performance and several variables related to lifestyle behaviors in a sample of Italian university 8 9 students from several degree courses in Palermo. Indeed, as far as we know, this is the first study aimed at investigating on the association between academic achievement and multiple variables 10 11 such as quality of nutrition, physical activity, amount and quality of sleep, use of illegal drugs, stress levels, self-esteem and perceived social support in a sample of Italian university students. 12 13 Exploring on these associations could be interesting for better understanding which of those variables is significantly correlated with better academic performance, especially considering a 14 15 population that live and study in a part of the Mediterranean area (Sicily) where it is relatively easier to access to a Mediterranean diet or to live in an extended family, receiving adequate social 16 support. It was hypothesized that healthy lifestyles were associated with academic success. 17 Specifically, the hypothesis was that the practice of a good diet, the abstention from the use of 18 illegal drugs and the habits to practice a regular physical activity would be reported by students with 19 a high academic achievement. Furthermore, quality of sleep and perceived social support would be 20 positively correlated with a better academic performance, while high-stress levels and high level of 21 22 Internet addiction would be positively correlated with a worst academic achievement.

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24 Methods

25 **Participants**

The survey involved a total of 466 volunteer students (26.5% males) from twelve different 26 degree courses at the University of Palermo. The university courses recruited were psychology 27 28 (22.9%), speech therapy (14.7%), physiotherapy (10.8%), language and intercultural studies (10.6%), medicine and surgery (9.7%), rehabilitation sciences (9.1%), psychiatric rehabilitation (6.0 29 %), science of nursing (5.0%), biomedical laboratory techniques (4.1%), healthcare (3.0%), 30 dentistry (2.2%) and literature and philosophy (1.9%). Two students were excluded because their 31 tests were invalid. The mean age of participants was 24.21 years (SD = 6.32), and the mean 32 education was 13.97 years (SD = 1.47). Men and women did not differ significantly in age t (1,462) 33 34 =.761, p = .453.

1 **Procedure**

The period of recruitment was from May to June 2017. The students were recruited through advertisements posted on university notice boards. The study was presented to the participants as an investigation of lifestyles and habits of university students, and the students were asked to answer self-report questionnaires anonymously before they started the lesson in a group setting. This study was approved by the ethical review board "Palermo 1", of the Policlinico "P. Giaccone" (Verb N° 01/2018). All participants gave written informed consent and all measures were managed under the respect of privacy.

9

10 Measures

Socio-demographic variables and lifestyle questionnaire An ad-hoc questionnaire was created to 11 12 investigate several topics linked to lifestyles. Specifically, participants answered questions about their daily diet, self-reporting how often in a week they ate several foods such as meat, fruits, 13 vegetables, cookies, etc. Furthermore, general information about their amount of sleep hours and 14 15 their tendency to practice or not regular physical activity were included in the questionnaire. Furthermore, information about the drugs intake at the time of the evaluation and typology of drug 16 were asked. Finally, other questions investigated other self-ascribed information such as age, sex, 17 18 marital status, occupation, habitual residence, and GPA. The typology of diet (good or bad) was calculated according to Sigfusdottir et al. (2007). 19

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Academic Achievement The formula the University of Palermo applies to evaluate their Erasmus program applicants was used as follows in order to quantify the level of academic achievement: the number of exams passed by a student during their career is expressed as a percentage over the theoretical number of exams that the student could have potentially passed during their career. The points are assessed considering the *GPA* and the percentage of passed exams, which is included in the calculation employing a regularity coefficient "*RC*" to obtain a correct grade point average (*CGPA*). The *RC* was based on the percentage of passed exams following this method:

28 • <25% (*RC* = 0.85)

29 • 25% -50% (*RC* = 0.90)

- **30** 50% -75% (*RC* = 0.95)
- 31 >75% (RC = 1)

Through this formula CGPA = GPA * RC a higher score is assessed for subjects who, for the same
GPA, reported a higher percentage of successful exams.

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Perceived stress To evaluate perceived stress, the Italian version of the Mesure du Stress Psychologique (MSP) was used. The MSP is a questionnaire consisting of 49 items based on different aspects related to the perception the subject has of his condition. The responses are presented on a Likert scale whose possible answers range from 1 to 4 (from "not at all" to "very"). The higher the score, the higher is the level of perceived stress. Cronbach's alpha of the Italianvalidated version is 0.95; test-retest stability was between 0.68 and 0.80 (Di Nuovo & Rispoli, 2000).

Internet Addiction The Internet Addiction Test (IAT, Young, 1998) is one of the most utilized diagnostic instruments for Internet addiction. It consists of 20 questions. The subject is invited to answer based on the frequency of the behavior described on a scale from 1 to 5 (from "never" to "always"). A cut-off value of 50 or higher has been suggested as indicative of problematic Internet use and 80 or higher is indicative of pathological use (Ngai, 2012; Young, 1998). The Italian version of the IAT was found to have good psychometric properties (Cronbach's alpha values are ranged from 0.83 to 0.86) (Fioravanti & Casale, 2015).

Social Support The Multidimensional Scale of Perceived Social Support (MSPSS) is composed of 15 16 12 items, each with a 7-point Likert-type response option that ranges from "very strongly disagree" (1) to "very strongly agree" (7) (Zimet, Dahlem, Zimet, & Farley, 1988). Thus, for each question, a 17 subject could indicate a score from 1 to 7. A total scale score can be calculated by summing across 18 the responses for all questions, with a possible range from 12 to 84. The higher the score, the higher 19 20 the level of perceived social support. The MSPSS has three subscales: "Friends" (Questions 6, 7, 9, and 12), "Family" (Questions 3, 4, 8, and 11) and "Significant Others" (Questions 1, 2, 5, and 10). 21 22 For the Italian version, the Cronbach's alpha coefficient was 0.90 (Di Fabio & Busoni, 2008) and the instrument has proven to have high reliability (Grassi, Rasconi, Pedriali, Corridoni, & 23 24 Bevilacqua, 2000).

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26 Statistical analyses

A correlation analysis was performed by using the Pearson coefficient in order to examine the relationship between academic success and amount of sleep hours, perceived social support, perceived stress and levels of Internet addiction. A Chi-Square test was used to evaluate significant differences between students with a high CGPA (score from 25 to 30) and students with a low CGPA (score from 18 to 24) regarding diet (bad or good diet, using the same procedure of Sigfusdottir et al. 2007), use of illegal drugs (using or not illegal drugs at the moment of the evaluation) and sports habits (practicing or not a regular sport at the moment of the evaluation). All 1 statistical analyses were conducted using SPSS for Windows 22.0.

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3 **Results**

The data from the survey conducted with the ad-hoc lifestyle assessment questionnaire 4 highlighted that the mean CGPA of the 466 students recruited was 26.18 (SD = 2.57) on a score 5 from 18 to 30. Furthermore, 35.3% of subjects took illegal drugs at least once in their life and the 6 7 most commonly used drug was cannabis (35.4% of the subjects recruited). Habitual alcohol consumption was reported by 314 students (67.8%), while 113 students (24.4%) reported a nicotine 8 9 addiction. Furthermore, seven students usually sleep less than 4 hours per day (1.5%), forty-four subjects (9.5%) usually sleep from 4 to 5 hours per day, while 337 subjects (72.6%) usually sleep 10 from 6 to 7 hours a day. Only 76 students (16.4%) reported an amount of sleep of at least 8 hours 11 per day. 12

13 The results showed that academic success (as measured by student's self-reported GPA weighed for percentage of successful exams) is positively correlated with perceived social support r14 = .148, p = .002, with family social support r = .093, p = .047, with friends' social support r = .101, 15 p = .030, with significant other social support r = .144, p = .002, and negatively correlated with 16 Internet addiction r = -.097, p = .037. No significant correlation was found between academic 17 18 success and perceived stress r = -.011, p = .810 or amount of sleep hours r = -.025, p = .590. Moreover, perceived stress was positively correlated with amount of sleep hours r = -.231, p < .001, 19 20 and negatively correlated with perceived social support r = -262, p < .001, with family social support r = -.142, p < .001, with friends' social support r = -.142, p < .001 and with significant 21 22 other social support r = -.187, p < .001. Internet addiction was negatively correlated with perceived social support r = -.217, p < .001, with family social support r = -.212, p < .001, with friends' social 23 24 support r = -.120, p = .010, with significant other social support r = -.211, p < .001, and positively correlated with perceived stress r = .351, p < .001 and with amount of sleep hours r = .113, p = .015. 25 26 No significant correlation was found between amount of sleep hours and perceived social support r27 = -.071, p = .127, family social support r = -.059, p = .201, friends' social support r = -.027, p = .027.558 or significant other social support r = -.070, p = .134 (please see Table 1). 28

The data also indicated that students with a low CGPA were more likely to report use of illegal drugs $\chi^2(1) = 11.126$, p = .001 and physical inactivity $\chi^2(1) = 3.977$, p = .046 compared to students with high CGPA. In contrast, high CGPA is associated with a healthy diet based on a Mediterranean style (including vegetables, fruits, whole grains, legumes, nuts, low fat, and low refined sugar, along with a reduction in the consumption of red meat) $\chi^2(1) = 11.148$, p = .001.

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1 Discussion

2 This study investigated the association between academic success and lifestyle behaviors in a sample of university students from several degree courses in Palermo, Italy. The hypothesis was 3 that healthy lifestyles, measured as a good diet, regular physical activity, satisfying sleep, low stress 4 levels, low level of Internet addiction, abstention from the use of illegal drugs and strong social 5 support were linked to better academic success. The results confirmed an association between 6 7 academic performance and healthy lifestyles of some of the variables considered in this study, including good social support and non-problematic use of the Internet. In addition, students with a 8 9 higher CGPA reported following a proper diet, regular sports activity, and abstention from illegal 10 drugs.

11 Specifically, a tendency to follow a good diet, based on a Mediterranean style, was reported by students with a higher CGPA. The Mediterranean diet is balanced because it provides complex 12 13 carbohydrates and animal and vegetable proteins in fair proportion, as well as vitamins, mineral salts, vegetable fibers, monounsaturated and polyunsaturated fatty acids, and antioxidants (Dalle 14 15 Grave & Mangeri, 2012). Several studies highlighted that the traditional Mediterranean diet could reduce the incidence of several diseases (Gardener & Caunca, 2018; Jaacks et al., 2018; Vitale et 16 17 al., 2018) and improve academic performance (Esteban-Cornejo et al., 2016; Barchitta et al., 2019) leading to a better academic achievement. 18

Several studies show that students who practice sports regularly tend to have a better academic achievement (Chuan et al., 2013; Gaston-Gayles & Hu, 2009; Muñoz-Bullón et al., 2017). Despite the sample recruited is quite heterogeneous in this area because over half the students do not practice physical activity, however, students with high CGPA were more likely to report to practice regular sports activity compared to students with low CGPA. This is important in underlining the relevance of scheduling an alternation between study time and sports time, not only to manage stress more positively, but also to improve academic performance.

26 Furthermore, the data of the present study show that the students with low CGPA were more likely to report use of illegal drugs compared to students with high CGPA. Students who use illegal drugs 27 28 reported less academic success. Moreover, a negative correlation between Internet addiction and academic success was highlighted. Students who spend excessive time on the Internet, gaming or 29 30 using social media do not achieve positive outcomes compared to students who use the Internet in a non-problematic way. Thus, the intake of illegal drugs and the problematic use of the Internet are 31 32 associated with a decline in academic performance. This result is congruent both with Akhter (2013) and Kubey et al. (2001). A possible explanation of these results is that addictive behavior 33 34 alters the reward system, contributing to the onset of psychological symptoms such as lack of

motivation, laziness and apathy, and these symptoms could negatively influence academic 1 2 performance. Indeed, drugs and behavioral addictions share similar behavioral, neuroanatomical and neurochemical correlates, as well as the same psychiatric comorbidities (Koepp et al., 1998; 3 Kuss, Pontes, & Griffiths, 2018; Maniaci et al., 2015, 2016, 2017; Potenza, 2006). Moreover, the 4 results of the present study showed that Internet addiction was positively correlated with perceived 5 stress. This result is congruent with Velezmoro, Lacefield, and Roberti (2010), who found that a 6 7 high level of stress associated with college life was predictive of Internet abuse. Indeed, according 8 to Leung (2006), stressful life events are significantly associated with the consumption of the 9 Internet for mood management and social compensation motives.

Furthermore, a significant negative correlation between Internet addiction and perceived
social support was found. This is in line with Esen and Gündoğdu (2010), who found that the lower
the level of parents and teacher support, the higher the Internet addiction level was.

13 No significant correlation was found between the number of sleep hours and academic success. However, this lack of significance could be explained by the consideration that most of the 14 15 students reported an average amount of sleep of 6–7 hours per night and considered the quality of their sleep as adequate and restorative. Unexpectedly, a positive significant correlation between 16 17 amount of sleep hours and Internet addiction was found. This is in contrast with a recent systematic review and meta-analysis that revealed a significant reduced sleep duration among individuals with 18 Internet addiction (Alimoradi et al., 2019). Furthermore, a significant correlation between amount 19 20 of sleep hours and perceived stress was found. Future research could be interested in investigating the relationship between these variables. 21

Moreover, no significant correlation was found between the students' stress levels and their 22 academic success. A possible reason could be that a reasonable amount of pressure can lead to 23 higher performance among people. In this regard, it was found that students with high levels of 24 stress actually attained higher academic achievement (Monk, 2004). Furthermore, a study with 114 25 undergraduates showed that in female students increasing amount of stress was related to the 26 improved academic performance (Kumar, Sharma, Gupta, Vaish, & Misra, 2014). Moreover, the 27 28 results of the present study found a negative correlation between perceived stress and perceived social support. Indeed, several studies provided evidence for the stress-buffering role of social 29 support (Cohen & Wills, 1985; Graff, Luke, & Birmingham, 2019; McQuaid et al., 2016). 30 Interventions to promote wellness should include those designed to mobilize social support, 31 32 enriching existing social bonds and modifying the dysfunctional ones (Barrera & Prelow, 2000).

Another relevant result of this study is the positive correlation between academic success and perceived social support. Students, who feel they have good social support from family, friends, or other significant persons, achieve better academic results. This is congruent with Rodríguez et al.
 (2017), who showed that family support was an indirect predictor of academic achievement.

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4 Strengths and limitations

The main limitation of this study concerns the lack of students from all the university 5 6 courses at the University of Palermo and a big percentage of participants come from the psychology 7 course, thus potentially influencing the results, because of their awareness about the topics related to the present study. However, the sample of the present study includes subjects from several 8 9 university programs, embracing students with heterogeneous socio-economic levels, both male and female, attending different academic years. Another limitation is the bias related to the self-reported 10 11 GPA; even if it is impossible be sure on the truthfulness of the self-reported GPA, students chose to voluntarily participate to the study without receiving any reward so it is reasonable hypothesize that 12 13 they were well motivated to report the truth. The results of the present study give compelling evidence of the association between healthy lifestyle behavior and academic performance in a 14 15 sample of Italian university students, taking into account several psychological variables. This association could be linked to the fact that, in general, students who are more disciplined in their 16 17 studies apply the same discipline in life, leading to healthier behaviors and habits. Also, it could be related to numerous cultural, social, psychological, biological, and genetic factors (Chamorro-18 Premuzic & Furnham, 2003; Greven, Harlaar, Kovas, Chamorro-Premuzic, & Plomin, 2009; 19 20 Lievens, Ones, & Dilchert, 2009; Turner, Chandler, & Heffer, 2009).

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22 Implications for research and practice

This study focuses on the relevance of promoting health-related behaviors at university in 23 24 order to improve the awareness of the students regarding the association of healthy lifestyles with better academic achievement. The results from this study might help retention centers to identify 25 26 students at risk of poor academic achievement, who could benefit from practicing a healthy lifestyle. Indeed, students could be more inclined to follow healthy behaviors if thinking that they 27 28 can achieve their life goals successfully. Furthermore, student wellness centers and departments of student success and retention may benefit from these findings to implement their programs in order 29 30 to support students to improve their academic performance. Moreover, universities can also take advantage from these findings by promoting opportunities for physical activities at the university 31 sports center and introducing healthier vending machine snacks options. Finally, this study showed 32 that a healthy diet, based on a Mediterranean style, is associated with a better academic 33

achievement; thus, in the light of its several benefits, other countries could introduce the
 Mediterranean diet in the university canteens.

Future research could be interested in investigating on the neurophysiological mechanisms involved in the association between healthy lifestyles and academic achievement. Furthermore, it could be useful demand access to university database in order to obtain the actual data on student performance, without having to rely on self-reported values. Finally, it could be useful to investigate additional variables related lifestyles, such as sexual behaviors, bullying experiences, injuries and the presence of psychopathology.

9

10 **Conflict of interest:** All Authors declare that they have no conflict of interest.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Table 1: Bivariate Pearson's correlation between academic success and behaviors of healthy lifetsyles.

FACTOR	ACADEMIC SUCCESS (n = 466)	PERCEIVED SOCIAL SUPPORT (n = 466)	FAMILY SOCIAL SUPPORT (n = 466)	FRIENDS' SOCIAL SUPPORT (n = 466)	SIGNIFICANT OTHER SOCIAL SUPPORT (n = 466)	PERCEIVED STRESS (n = 466)	INTERNET ADDICTION (n = 466)	$\begin{array}{c} \text{AMOUNT OF} \\ \text{SLEEP} \\ \text{HOURS} \\ (n = 466) \end{array}$
ACADEMIC SUCCESS	-	.148 ***	.093 *	.101*	.144 ***	011 NS	097 *	025 NS
PERCEIVED SOCIAL SUPPORT	.148 ***	-	.824 ****	.492 ****	.854 ****	262 ****	217****	071 NS
FAMILY SOCIAL SUPPORT	.093 *	.824 ****	-	.290 ****	.584 ****	246 ****	212****	059 NS
FRIENDS' SOCIAL SUPPORT	.101*	.492 ****	.290 ****	-	.348 ****	142 ****	120 *	027 NS
SIGNIFICANT OTHER SOCIAL SUPPORT	.144 ***	.854 ****	.584 ****	.348 ****	-	187 ****	211 ****	070 NS
PERCEIVED STRESS	011 NS	262 ****	142 ****	142 ***	187 ****	-	.351 ****	.231 ****
INTERNET ADDICTION	097 *	217 ****	212 ****	120 *	211 ****	.351 ****	-	.113 *
AMOUNT OF SLEEP HOURS	025 NS	071 NS	059 NS	027 NS	070 NS	.231 NS	.113 *	-

Note. NS Non significant; **p* < .05; ***p* < .01; ****p* < .005; *****p* < .001.