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Development and implementation of health education programs through new
technologies: healthy diet, smoking, alcohol, doping & aggressive behavior

PhD Dissertation

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«Με ατομική μου ευθύνη και έχοντας επίγνωση της δυνατότητας επιβολής κυρώσεων από τη Συνέλευση του Τμήματος, δηλώνω υπεύθυνα ότι για τη συγγραφή της Διδακτορικής μου Διατριβής δεν χρησιμοποίησα ολόκληρο ή μέρος έργου άλλου δημιουργού ή τις ιδέες και αντιλήψεις άλλου δημιουργού χωρίς να γίνεται αναφορά στην πηγή προέλευσης (βιβλίο, άρθρο από εφημερίδα ή περιοδικό, ιστοσελίδα κτλ.). Επιπρόσθετα, δηλώνω ότι έλεγξα την πιθανότητα λογοκλοπής της τελικής έκδοσης της Διδακτορικής Διατριβής μέσω της ηλεκτρονικής πλατφόρμας Turnitin και κατέθεσα τη σχετική ανάλυση και τα αποτελέσματά της σε ηλεκτρονική και έντυπη μορφή στη Γραμματεία του Τμήματος.»

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Dedication

To my dearest daughters, the radiant stars of my life, Naya and Electra, who have illuminated my journey. As you grow and evolve, may this dissertation serve as a reminder that you have the strength to turn dreams into reality and that I will always be here, cheering you on from the sidelines.

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Abstract

The aim of the present study was to develop, implement, and evaluate five theory-based educational intervention programs targeting to prevent unhealthy diet, doping use, alcohol consumption, smoking, and bullying among Greek elementary and secondary students. To accomplish this, five distinct research studies were conducted. The initial four interventions were deployed via an online platform and supervised by physical education instructors, while the final intervention, addressing bullying behavior, was formulated, implemented, and assessed by the researcher.

Study 1

This study examined the effectiveness of a school-based health education program, promoting healthy diet and exercise, named DIEX implemented on adolescents. The program is based on the Theory of Planned Behavior (TPB) supported by life skills training. The recipients of the program were high school students ($n = 367$; 168 boys and 199 girls), from 14 schools in Greece, who attended 10, 1-hour sessions, implemented by their schoolteachers. Data were collected before and after the program implementation, through online questionnaires, for: a. attitude, intention, subjective norms, and PBC towards healthy eating; b. knowledge about healthy eating; c. exercise behaviour; attitude towards the DIEX program; and d. satisfaction with the DIEX program (only post). Results showed that there were significant differences among pre- and post-measures of students' knowledge and behavior about healthy diet, as well as attitudes and satisfaction towards the program's application. Such results show that the DIEX program may have an improvement in dietary behavior variables. Conclusively, a theory-based behavioral intervention with skills training may have positive behavior changes

for young students during health education in school settings with the assistance of new technologies.

Keywords: Adolescents, healthy diet, Planned Behavior Theory, health education intervention, Life skills, Behavior change, Exercise.

Study 2

The present study aimed to assess the effectiveness of a school-based educational program targeting to educate and change the behavior of Greek high school students toward doping use, named “*Doping destroys health and sports*” (DOSPO). The program was based on the Theory of Planned Behavior (TPB) principles and was assisted by life skills training. The participants were 65 students from five Greek secondary schools (27 boys and 38 girls; $M_{\text{age}}: 15.07 \pm 1.17$ years). Before and after the program’s implementation, students completed online a number of well-established questionnaires measuring their intention, attitudes, subjective norm, perceived behavioral control (PBC) towards doping use and learning about doping, knowledge about doping, exercise behavior, attitudes, and satisfaction with the DOSPO program implementation. Results showed significant differences in students’ knowledge of doping use, their intentions to learn about doping use, and their attitudes toward the program’s implementation. Such results indicated the effectiveness of a theory-based, life skills-assisted educational school program on students’ knowledge and specific behavior variables, which may be proven promising for the development of future school-based health education interventions.

Keywords: Theory of Planned Behavior, doping, prevention, life skills, adolescents

Study 3

In this pilot study, we assessed the effectiveness and acceptability of an educational program designed to prevent alcohol-related behaviors among high school students. The program was rooted in the principles of the Theory of Planned Behavior and supplemented with life skills teaching. A total of 352 participants were involved, representing ten secondary schools in central Greece. Among these, 257 students (125 boys, 131 girls; one participant did not disclose their gender; Mean Age: 14.51 ± 1.34 years) constituted the experimental group, while 95 were assigned to the control group. The experimental group engaged in a 10-week program, with each session lasting for 1 hour. The results demonstrated significant enhancements in students' knowledge about alcohol, perceived behavioral control, and alcohol-related behaviors. Additionally, participants expressed high levels of satisfaction with the program. These findings offer substantial evidence for the practicality and effectiveness of an alcohol prevention initiative that is rooted in theory and supported by life skills education, when implemented within a school environment.

Keywords: pilot study, adolescents, alcohol prevention, Theory of Planned Behavior, life skills, behavior change

Study 4

Our study aimed to assess the effectiveness of a health education program in preventing bullying among elementary school students in Greece. The program was designed based on the Theory of Planned Behavior and included life skills instruction. We enrolled 203 students (with an average age of 11.37 years) and randomly assigned them to either the experimental or control group. The experimental group participated in eight one-hour sessions over an eight-week period. Our findings revealed that the experimental group had significantly greater

knowledge about bullying than the control group. However, there were no notable differences in TPB variables between the two groups before and after the program. The students who participated in the program expressed high levels of satisfaction. Our study highlights the significance of the aforementioned factors for future research endeavors aimed at preventing bullying in elementary school students in Greece.

Keywords: Students, bullying, aggressive behavior, school-based intervention, adolescents, life skills, Theory of Planned Behavior

Study 5

In this follow-up study, we aimed to assess the effectiveness of the "I do not smoke, I exercise" anti-smoking preventive health education program. This program, grounded in the Theory of Planned Behavior (TPB) and supplemented with life skills instruction, was targeted at high school students. The intervention comprised ten one-hour online sessions, administered by physical education instructors. The study cohort comprised 222 students (109 boys, 113 girls) from 11 secondary schools, with an average age of 16.42 ± 1.36 years. Data collection involved pre- and post-intervention self-assessment questionnaires. Results revealed a noteworthy enhancement in students' knowledge regarding smoking, perceived behavioral control (PBC), and overall program satisfaction following the intervention. Conversely, no significant alterations were observed in TPB-related smoking variables. These findings bear substantial implications for the design and implementation of smoking prevention initiatives in the Greek context.

Keywords: adolescents, smoking, Theory of Planned Behavior, school-based intervention, adolescents, life skills

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Chapter 1

Introduction – Literature Review

Non-communicable diseases constitute ninety percent of fatalities in the European region, with six out of ten attributable to modifiable risk factors like unhealthy dietary patterns, tobacco consumption, alcohol use, sedentary lifestyle, and environmental factors (WHO, 2019). These behaviors are closely linked to significant adverse health consequences, including obesity, mental disorders, and heightened susceptibility to chronic illnesses (Corona, 2014; Ding et al., 2015; Gakidou et al., 2017; Loewen et al., 2019). Unhealthy behaviors, encompassing smoking, disordered eating patterns, regular alcohol intake, aggressive conduct, and reliance on illicit substances, have been observed to exhibit positive associations with doping use (Irving et al., 2002; Pedersen et al., 2001; Shah et al., 2019). Furthermore, researchers have identified a connection between smoking and elevated levels of aggression or interpersonal violence in adolescents (Rudatsikira et al., 2007; Solnick et al., 2014). During adolescence, numerous health-related behaviors like smoking, marijuana use, dietary habits, encounters with bullying, and insufficient physical activity, have shown associations with psychosocial challenges (Busch et al., 2013). The co-occurrence of multiple health behaviors in adolescents has been well-documented (Conry et al., 2011; Dodd et al., 2010; Noble et al., 2015), emphasizing the critical need for intervention.

According to the World Health Organization (WHO, 2017), adolescents are defined as individuals between the ages of 10 and 19. This phase represents a crucial transitional period characterized by both physical and psychological development, heightened social interaction, expanded capabilities, and a burgeoning sense of independence from parents, accompanied by notable advancements in emotional, social, and cognitive growth (Crews et al., 2016; WHO, 2021). Given the significance of this phase in establishing and sustaining good health, there is

a prevalent concern regarding adolescents engaging in unhealthy behaviors (Bae et al., 2014; WHO, 2021). Adolescence serves as a pivotal period for individuals to adopt health-related behaviors, as they progress into a life stage where these behaviors tend to solidify and become more habitual (Olson et al., 2017). Consequently, even minor alterations in these behavioral patterns possess the potential to yield substantial impacts on the overall health status of a population (Ezzati et al., 2002; GBD, 2016; Swann et al., 2010). Initiatives in health promotion should prioritize children and adolescents, recognizing this phase as the critical period where enduring health behaviors take root (Viner et al., 2012), exerting enduring influence on individuals' well-being and health trajectory throughout their lifetime (Olson et al., 2017).

In consideration of the foregoing points, it is imperative to acknowledge the pivotal role that health education assumes in both preventing and fostering positive shifts in behavior, as well as in cultivating enduring healthy practices (WHO, 2015). Initially characterized by Simonds (1974), health education was defined as the ability to comprehend, assess, and apply health-related information to make well-informed decisions regarding one's own health. Human behavior is subject to a multitude of intricate influences, thus emphasizing the critical need for the development of health education interventions that concentrate on augmenting competence, motivation, and opportunities (Lytle, 2005). Education stands as a cornerstone within the framework of effective health behavior interventions, bearing significant responsibility in the attainment of intervention objectives (Arlinghaus & Johnston, 2018; Avery et al., 2013). From this vantage point, educational institutions, particularly schools, emerge as pivotal arenas exercising substantial influence over the broader societal and cultural milieu of young individuals. Considering the near-universal participation of young people in educational settings, the school environment affords an optimum context for the examination, prevention, and evaluation of unhealthy behaviors (Hall, 2017; Majcherová et al., 2014; Pulimeno et al., 2020).

The prevailing consensus in the literature consistently underscores that the most impactful health interventions are those firmly rooted within a behavioral theoretical framework (Craig et al., 2013; Davis et al., 2015; Glanz & Bishop, 2010). These theoretical frameworks are meticulously crafted to elucidate the determinants underpinning human behavior and establish environments, both social and physical, that foster and encourage healthier choices (Lytle, 2005). For health intervention programs to be deemed effective, it is imperative that they evince a discernible alignment with psychological and cognitive proficiencies (Dir et al., 2017; Onrust et al., 2016). These programs should diligently adhere to a comprehensive framework founded upon theoretical tenets, with a specific focus on behavioral modifications.

Theory of Planned Behavior and Behavior Change

Ajzen (1991, 2002) introduced the Theory of Planned Behavior (TPB) as a theoretical framework for expounding volitional actions within the domain of social psychology. Classified as a cognitive theory, TPB provides a conceptual structure that facilitates the projection of individuals' behavioral intentions, thereby enabling the anticipation of the likelihood of their engagement in a specified behavior (Ajzen, 2020). According to TPB, attitudes pertain to an individual's comprehensive behavioral beliefs, subjective norms encompass the individual's perceptions regarding whether significant figures in their social circle endorse their participation in the behavior, and perceived behavioral control pertains to individuals' perceptions regarding their capacity to execute specific actions. In aggregate, these components function as prognostic indicators of an individual's intention to either enact or refrain from the behavior (Fishbein & Ajzen, 2011). Additionally, "intention" is conventionally employed as a predictive determinant of actual behavioral enactment (Morwitz & Munz, 2021). Various relevant meta-analyses have robustly demonstrated the efficacy of employing the TPB

framework, revealing noteworthy positive outcomes across a spectrum of health behaviors and associated factors. These interventions have shown effectiveness in addressing behaviors such as smoking, dietary habits, aggressive behavior, alcohol consumption, and doping use (Cooke et al., 2016; Khani Jeihooni et al., 2021; Steinmetz et al., 2016).

Life skills for behavior change

A protective factor against the development of unhealthy behaviors is Life Skills (LS) education, which operates as an effective strategy in not only enhancing physical well-being but also elevating psychological wellness, thereby acting as a deterrent against unhealthy behaviors among young individuals (Botvin & Griffin, 2004). Life skills, as defined by the World Health Organization (WHO, 1997), encompass the competencies enabling individuals to adeptly manage the demands and pressures of daily life. These skills are classified into three domains: physical, cognitive, and behavioral (Danish & Donohue, 1995). Importantly, they can be acquired through interactive instruction and practical application (Goudas, 2010), with interactive programs demonstrating superior effectiveness compared to information-driven approaches (Tobler & Stratton, 1997). Particularly in adolescence, life skills education plays a pivotal role in nurturing health-related self-regulation (Kirchhoff & Keller, 2021). To illustrate, Hale et al, (2014), found that multi-behavior programs incorporating life skills training were notably effective in promoting a healthier lifestyle and a positive behavioral transformation. The integration of life skills in smoking reduction initiatives, whether employing cognitive behavior or life skills modalities within a school-community framework, has shown promising results in enhancing adolescent smoking reduction rates (Cuijpers, 2002; La Torre et al., 2005; Lee & Kim, 2017). Protective factors against alcohol misuse encompass individual traits such as self-control, heightened mindfulness, robust anti-substance beliefs, motivation for good health maintenance, school connectedness, and engagement in structured activities (Dudok &

Piko, 2023; Nawi et al., 2021; Nelson et al., 2017). Moreover, participation in bullying has been associated with difficulties in regulating negative emotions (Parris et al., 2019). This suggests that the acquisition of life skills holds the potential to prevent aggressive behaviors among youth (Kartal & Cavusoglu, 2022).

Physical activity as a complementary strategy for behavior change

Engaging in physical activity constitutes a fundamental and adjunctive measure for safeguarding against a range of illnesses and conditions. Research has shown its positive impact on cardiometabolic health, cognitive function, and mental well-being (Bull et al., 2020). Multiple studies have demonstrated the beneficial association between participation in sports and physical activity in countering unhealthy behaviors (Thompson et al., 2020; Ussher et al., 2019). For example, engaging in physical activity is associated with a reduced risk of bullying, while not meeting activity guidelines and excessive sedentary behavior are linked to higher victimization (Sibold et al., 2015; García-Hermoso et al., 2020). The use of physical activity as a component of interventions aimed at youth, holds promise for reducing bullying, as it enhances psychosocial development, instills prosocial values, fosters social competence, and prevents problematic behaviors including bullying (Mahoney et al., 2005; Majed et al., 2022). Moreover, physical activity can influence substance use treatment, by promptly diminishing cravings and impulsive urges, fostering positive emotions and mood, and ultimately ameliorating concurrent conditions such as depression and anxiety, frequently linked with detrimental behaviors (Bardo et al., 2015; Manthou et al., 2016; Patterson et al., 2022; Volkow et al., 2019).

Web-Based health education

In recent years, there has been a notable surge in internet and computer usage, particularly among the younger demographic, who devote a substantial portion of their time to computer-based activities (Dam et al., 2023). The interest in employing web-based interventions within the health field continues to grow (de Sousa et al., 2022). Web-based health education provides independence, accessibility, cost-effectiveness, and adaptability through emerging technologies (Coşkun et al., 2019). Integrating online training with real-life interaction enhances the efficacy of interventions, enabling adolescents to autonomously acquire knowledge and skills (Elbe & Brand, 2016). For instance, in the context of promoting healthier dietary habits among adolescents, there is a growing body of research suggesting that successful school-based interventions should encompass theoretical foundations, physical activity (PA), the integration of digital technology, and the application of persuasive communication (Beck Silva et al., 2022; Hackman & Knowlden, 2014; Meiklejohn et al., 2016). Similarly, the development of computer-tailored smoking prevention programs holds promise as an effective strategy for preventing smoking among adolescents (Cremers et al., 2012; de Josselin de Jong et al., 2014). Additionally, the incorporation of technology, internet-based educational programs, communication technologies, and life skills has demonstrated effectiveness as supportive measures (Barkoukis et al., 2013; Champion et al., 2013).

The present study

Approximately one in eight children, aged 7 to 8, grapple with obesity, significantly increasing their likelihood of carrying this concern into adulthood. (WHO, 2021). Projections suggest that by 2030, an estimated 254 million children and adolescents worldwide will be classified as obese (Finkelstein et al., 2012). Additionally, a body of research highlights that overweight youth face a spectrum of health challenges, including depression, low self-esteem, behavioral issues, and instances of bullying (Corona, 2014; Waasdorp et al., 2018). Previous research suggests that adolescence, a critical phase for personality development, tends to

precipitate conflicts and incline individuals toward engaging in risky behaviors such as acquiring and using illicit substances, alcohol, and tobacco (Keyes et al., 2015). On another note, school health education programs yield positive outcomes for students, schools, and their social dynamics, resulting in heightened levels of satisfaction, motivation, positive attitudes, personal development, competencies, knowledge, and improved health (Griebler et al., 2017; Kolbe, 2019). Regrettably, there has been a decline in participation in both primary and secondary schools for these programs in Greece (Kadigiannopoulos et al., 2018; Spyropoulou, 2008). Furthermore, the promotion of physical activity can serve as a comprehensive lifestyle shift, not only replacing unhealthy behaviors but also leading to a sustained healthier way of life (Rippe, 2018). Employing the TPB, in conjunction with life skills has demonstrated effectiveness in enhancing knowledge and transforming behavior across various unhealthy habits.

Aim of the study

As has been previously reported in the literature, extensive research has investigated the advantages of employing the TPB, life skills instruction, and innovative technologies to effectively address and modify unhealthy behaviors in adolescents. This study aims to design, develop, implement, and assess five health education programs rooted in TPB with the assistance of life skills teaching. These programs aim to deter unhealthy dietary practices, discourage doping use, prevent alcohol consumption, reduce smoking, and combat bullying among adolescents. The promotion of physical exercise will be integrated as an auxiliary component, facilitated by the use of innovative technologies. The research hypothesis posits that the five health education programs implemented in schools will have an impact on health-related behavioral factors among adolescents.

Definition of Key Terminology

This segment furnishes explanations for the primary concepts that constitute the pivotal elements of this investigation.

A healthy diet as defined by the World Health Organization (WHO, 2018), involves modifying dietary habits to achieve a balance in calorie intake, decrease the consumption of saturated and trans-fats, and augment the intake of unsaturated fats (Bravi et al., 2018; Zong et al., 2016). Additionally, it entails an elevation in the consumption of fruits and vegetables and a reduction in sugar and salt intake (WHO, 2018). Adequate nutrition plays a pivotal role in facilitating healthy growth and fostering cognitive, behavioral, and social-emotional development (Irwin et al., 2007).

Doping refers to the illicit use of forbidden methods or substances with the aim of enhancing performance, typically with the intent to secure a competitive edge over opponents (Petróczi, 2007). This characterization encompasses fundamental components found in earlier definitions, including the notion of artificial enhancement and the deliberate pursuit of advantage (Breivik, 1987; Lueschen, 1994; Watson et al., 2022). Doping practices may encompass the ingestion of proscribed performance-enhancing drugs (PEDs) or the application of prohibited methodologies (WADA, 2022).

Alcohol consumption entails the ingestion of beverages containing ethyl alcohol. People primarily consume alcoholic beverages for their physiological and psychological impacts (Carson-DeWitt, 2001).

Smoking involves the inhalation and exhalation of smoke produced by burning plant material. Various substances, such as marijuana and hashish, can be smoked, but tobacco, commonly found in cigarettes, cigars, and pipes, is most strongly associated with this practice. Nicotine, an addictive alkaloid present in tobacco, induces both stimulating and calming psychoactive effects (INSERM Collective Expertise Centre, 2004). Tobacco claims the lives of as much as half of its consumers. Annually, it causes the demise of over 8 million individuals, encompassing 1.3 million non-smokers who are subjected to second-hand smoke (WHO, 2021).

Bullying constitutes a form of aggressive behavior, defined as purposeful actions aimed at causing harm or discomfort to another individual. Typically unprovoked, it is categorized as proactive aggression, distinct from reactive aggression. Bullying is characterized by unique features including an imbalanced power dynamic and repetitive occurrences. The widely accepted criteria for identifying traditional bullying encompass intentionality, repetitiveness, and power imbalance (Olweus, 2013).

Health education is described as “any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes” (WHO, 2022)

Physical activity is defined as encompassing any bodily motion generated by skeletal muscles, necessitating an expenditure of energy. This encompasses movement during leisure, transportation, or as an integral component of one's occupational engagement. Engaging in physical activities of both moderate and vigorous intensity contributes positively to health outcomes (WHO, 2022).

Theory of Planned Behavior (TPB), is a prominent framework for behavior description and prediction (Ajzen, 1991; 2002). Derived from the Theory of Reasoned Action (Fishbein & Ajzen, 2010), the TPB is particularly suitable for addressing various behavioral changes by discerning beliefs associated with health-related behaviors in specific contexts (Ajzen, 1991; 2012). According to the Theory of Reasoned Action, behavioral intention is the primary predictor of behavior, indicating an individual's readiness to engage in a specific behavior, shaped by their attitude towards it and subjective norms (Fishbein & Ajzen, 2011). The TPB extends the TRA by introducing perceived behavioral control as a third construct, reflecting an individual's perceived ability to execute the behavior, with a direct impact on actual behavior. In essence, TPB posits that behavior is influenced by intention, which is determined by attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991; 2012; Fishbein & Ajzen, 2011).

Life Skills as defined by the WHO (1997) encompass the abilities needed to adeptly manage everyday demands and pressures. Categorized into physical, cognitive, and behavioral domains (Danish & Donahue, 1995), these skills can be acquired through interactive teaching and practice (Goudas, 2010). Life skills encompass behavioral, cognitive, social, and emotional competencies (Danish et al., 2004). The acquisition and proficient application of these skills by an individual has the potential to cultivate essential capabilities (Goudas, 2010). Life skills form the foundational abilities for demonstrating constructive behaviors, enabling individuals to fulfill social roles, establish supportive relationships, and navigate interpersonal challenges without harm (WHO, 1997)

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Chapter 2

Study 1

Implementation and Evaluation of a School-Based Educational Program Targeting Healthy Diet and Exercise (DIEX) for Greek High School Students

Abstract

The present study examined the effectiveness of a school-based health education program promoting healthy diet and exercise, named DIEX, implemented on adolescents. The program is based on the Theory of Planned Behavior (TPB) and is supported by life skills training. The recipients of the program were high school students ($n = 367$; 168 boys and 199 girls) from 14 schools in Greece who attended 10 1 h sessions implemented by their schoolteachers. Data were collected before and after the program implementation through online questionnaires for: a. attitude, intention, subjective norms, and PBC toward healthy eating; b. knowledge about healthy eating; c. exercise behavior and attitude toward the DIEX program; and d. satisfaction with the DIEX program (only post-program). The results showed that there were significant differences among the pre- and post-measures of students' knowledge and behavior about healthy diet, as well as attitudes and satisfaction toward the program's application. The results show that the DIEX program may have improved nutrition behavior variables. Conclusively, a theory-based behavioral intervention with skills training may result in positive behavioral changes for young students during health education in school settings with the assistance of new technologies.

Keywords: adolescents, healthy diet, planned behavior theory, health education intervention, life skills, behavior change, exercise

1. Introduction

The Global Nutrition Report (The Global Nutrition Report, 2022) highlights the importance of taking care of malnutrition and poor diets, as obesity and nutrition-related disease rates are increasing alarmingly, with no signs of slowing. According to the WHO Europe (WHO, 2022), almost one in eight children between the age of 7 and 8 years old is obese. Overweight children are at elevated risk of becoming obese adults (Singh et al., 2008). Data analyses indicate the prevalence of obesity and overweight children and youth globally (NCD Risk Factor Collaboration, 2007). The prospects are worsening, as it is estimated that 254 million children and adolescents will be classified as obese by 2030 (Finkelstein et al., 2012). On top of that, several studies have stated that overweight youth face multiple health conditions, such as depression, low self-esteem, behavior problems, and bullying (Corona et al., 2014; Waasdorp et al., 2018). Overweight children and adolescents have negative body image and body dissatisfaction (Mond et al., 2011). Moreover, obesity is associated not only with mental and psychological issues, but also with serious health problems, such as cardiovascular disease, type 2 diabetes, musculoskeletal disorder, and some forms of cancer (WHO, 2022).

Adolescent health is overlooked in global public health because this age group is regarded as healthy (Patton et al., 2016). Healthy diet guidance should be taught to children from early childhood, as those early childhood years are critical for forming healthy eating habits in the long term (Langford et al., 2015). Indeed, health risk behaviors are formed during childhood and adolescence (Craigie et al., 2011; Telama et al., 2009), and school has been recognized as a proper environment for initiating a health education program (Pulimeno et al., 2020). The literature suggests that school healthy diet education interventions present promising results in improving adolescents' healthy diet choices (Medeiros et al., 2022).

Reviews have demonstrated that the most efficient health interventions will be those that include a behavioral theory framework (Craig et al., 2013; Davis et al., 2015; Glanz & Bishop, 2010). These theoretical frameworks aim to understand the predictors of human behavior and create a healthy social and physical environment for healthier options (Lytle, 2015). Human behavior is affected by several factors; thus, it is crucial to design a health education intervention by targeting the competence, motivation, and opportunities (social and environmental) that affect the healthy diet of school children. The Theory of Planned Behavior (Ajzen, 2012) has been proven to be an effective approach for transforming an undesirable behavior into a healthy behavior (Fertman & Grim, 2016). It has been used in research on health-related behaviors (Gourlan et al., 2016; Malek et al., 2017) as well as for the evaluation and planning of several behavioral change interventions (Ajzen, 2020). According to previous findings, behavioral change interventions would benefit from the use of the TPB framework, as it has been found useful in improving dietary behaviors among youth. Riebl et al. (2015), reviewed three interventions, and their findings indicated changes toward healthy eating behavior and modified intentions toward healthy diet choices. More specifically, attitude has been found to be the stronger predictor of intention, and intention is the most significant construct of TPB to predict healthy diet behavior.

According to research, participation in regular exercise is highly recommended to prevent nutrition-related health problems (Verduci et al., 2022). For example, Drenowatz & Greier (2007), demonstrated that healthy dietary choices and involvement in sports are related to motor competence, which indicates that they are important contributors to a healthy and active lifestyle (Bremer & Cairney, 2016). Moreover, Meng et al. (2018), evaluated the effectiveness of a two-year obesity prevention program, targeting sports dietary education and healthy eating behaviors, in promoting daily PA and learning life skills among adolescent

athletes. The intervention significantly decreased unhealthy food consumption and highlighted the importance of engaging in PA.

A multicomponent approach is needed to apply an effective intervention that aims to prevent childhood obesity, targeting the modification of exercise, lifestyle, and dietary behavior (Koletzko et al., 2020). Thus, testing the validity of a multi-strategy school-based education program targeting the promotion of healthy diet and exercise can contribute to the improvement of existing areas of relevant programs and add knowledge that can be used in the development of future ones.

1.1. Theory of Planned Behavior (TPB) and School-Based Educational Programs Targeting Healthy Diets

Relevant reviews have stressed that school-based programs covering a variety of strategies can be effective in promoting healthy diet among youth (Meiklejohn et al., 2016). Steinmetz et al. (2016), reviewed a range of interventions and concluded that the TPB is a popular model for explaining the mechanisms underlying the adoption of healthy behaviors. The TPB, which evolved from a prior theoretical framework, the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Montano & Kasprzyk, 2015) is an appropriate theoretical framework for considering multiple behavioral changes, as it allows the identification of beliefs related to the production of health-related behaviors within a specific context (Nilsen, 2020). According to the TRA, the strongest predictor of behavior is behavioral intention, which indicates whether a person is ready to perform the aforementioned behavior. This behavior, subsequently, is predicted by attitude toward the behavior (the degree to which an individual evaluates the behavior and its outcome as positive or negative) and subjective norms (individual's comprehension of the social pressure of significant others to participate), (Conner et al., 2007). The TPB extends the TRA, with the addition of a third construct, the perceived

behavioral control (perceived ability of an individual to control the behavior), which is thought to have a direct impact on the behavior (Arrizabalaga-López et al., 2018).

School-based educational interventions guided by TPB have exhibited a post-intervention positive change in participants' intentions and dietary behaviors, and they have also been found to improve children's and adolescents' behaviors toward healthy diet, increased fruit and vegetable consumption, and decreased junk food consumption (Arrizabalaga-López et al., 2018, Harrington et al., 2020; Singh et al., 2020) attitude, and perceived behavioral control (Kaveh et al., 2020; Singh et al., 2020). More specifically, in a recent study by Kaveh et al. (2020) female adolescents followed a nutrition education intervention based on the TPB model with the addition of a parental control construct. The results showed increased knowledge after the program's implementation and an increase for all TPB constructs, indicating the effectiveness of such interventions. According to these findings, Dhauvadel et al. (2019) implemented and evaluated a school educational healthy diet intervention among school-going adolescents. Intention and attitude toward healthy eating significantly increased post-test. Similarly, in the study by Harrington et al. (2020) they tested the effectiveness of a Summer Food Service Program (SFSP) on high school students' intentions to improve their eating habits by consuming more fruits and vegetables.

In a recent review, Salam et al. (2020) suggested that an effective intervention targeting obesity prevention among adolescents could consist of a combination of behavioral therapy, exercise, and diet. Furthermore, computer-based health education programs are considered a promising strategy (De Bourdeaudhuij et al., 2011). A growing body of evidence suggests that effective whole-school interventions should encompass theory-based approaches, PA, the use of digital technology, and persuasive communication (Beck Silva et al., 2022; Hackman & Knowlden, 2014; Meiklejohn et al., 2016).

School health education programs integrate educational components, which aim to improve students' well-being (Kolbe, 2019; Lee et al., 2020). In most European countries, health education does not consist of an autonomous project; rather, it constitutes a part of other school courses (Abdelkarim et al., 2016). Greek health education programs are limited and implemented on a voluntary base by teachers, and they are not included in the compulsory curriculum (Cholevas et al., 2012). Taking these into consideration, it is advisable to develop school-based health education programs to prevent unhealthy behaviors and educate adolescents about the harmful effects of making unhealthy choices.

1.2. TPB and School-Based Educational Programs Targeting Exercise

Unhealthy diet in coexistence with low levels of exercise has been shown to have high impact on obesity in youth (Ajzen, 2011). Intervention programs based on the TPB framework have been found to be effective in promoting exercise (Ajzen, 2011). It has been proposed that such interventions are more effective than other theory-based interventions (Webb et al., 2010). Moreover, a combination of exercise and behavior-change strategies has been found to be more effective in maintaining and increasing PA (Glanz & Bishop, 2010).

McIntosh et al. (2017), reviewed web-based PA interventions among youth, proposing that theory-based and web-based interventions have been successful at increasing adolescents' PA levels. For example, Plotnikoff et al. (2011) found that intention is the mediator variable of TPB constructs for adolescents to start exercising. A number of studies suggested that multi-component interventions are more likely to succeed in developing exercise habits among youth (Dobbins et al., 2013; Kriemler et al., 2011). It is interesting to note that, in a review by Hsu et al. (2018), the most common behavior change techniques used in interventions targeting adolescents were social support, demonstration of behavior, goal setting, and feedback.

To the best of our knowledge, only a few studies have tested the effectiveness of a TPB intervention targeting only exercise behavior among youth during leisure time (Chatzisarantis et al., 2015; Chatzisarantis & Hagger, 2005). The results showed that the most important factors for the effective promotion of PA are the beliefs and the impact of information communication during the intervention. In a relevant study, Kawabata et al. (2018) indicated the importance of salient beliefs in promoting PA in secondary students. In this study, Physical Education (PE) teachers were communicating persuasive messages to the intervention group during PE lessons.

Although there are numerous interventions to promote PA among youth (Dobbins et al., 2013) the results show a limited effect on PA levels (Love et al., 2017; Metcalf et al., 2012). It is suggested that health education programs should not isolate health behaviors, but follow an integrated approach (Coulson et al., 1997). Thus, exercise has been combined with other health-related behaviors successfully (Schoeppe et al., 2016). Zhang et al. (2020) evaluated the effectiveness of a combined theory-based intervention on psychological effects and PA among adolescents. Their results indicated higher scores related to PA and self-efficacy in the intervention group.

1.3. Life Skills and School-Based Programs Targeting Healthy Diet and Exercise

Danish defined life skills as "... those skills that enable individuals to succeed in the different environments in which they live" (Hodge et al., 2016). Life skills are classified as behavioral, cognitive, social, or emotional (Danish et al., 2004) and they can lead to required abilities when they are learned and practiced successfully by an individual (Goudas, 2010). Additionally, life skill education has been proven more effective when implemented through a whole-school approach (WHO, 2020). Young people's risky behaviors, such as sedentarism, unhealthy diet, and time passed on media devices are worsening (Brooks et al., 2020) and life

skills education has been proven an effective way to promote positive behaviors and reduce unhealthy ones among school-going adolescents (Aishath et al., 2018). The literature confirms that the school setting has a key role in promoting a healthy lifestyle and preventing non-communicable diseases (Saraf et al., 2012). School education interventions are important for fostering youths' identity development and helping them to acquire and practice skills to cope with everyday difficulties. such as problem-solving, decision-making, stress coping, and critical thinking (Tiwari et al., 2014). Indeed, Hale et al. (2014), reviewed multi-behavior approach programs and reported that the most effective were those that included a life skills training strategy. For example, Anand et al. (2014), explored the effectiveness of an 8-month life skill school intervention promoting PA in secondary students. Skills training was distributed by experts and the results indicated a positive impact on all types of PA among students. Additionally, they stressed that health education programs that develop health-related skills and communicate knowledge and attitudes toward healthy behaviors have promising results in assisting adolescents to adopt healthy behaviors. Givaudan et al., (2020) evaluated the effectiveness of the school-based program "I want to, I can... improve child nutrition and prevent diabetes", integrating life skills education. The aim of the program was to reduce psychosocial barriers, promote PA, and prevent obesity among teachers, students, and parents. The post-intervention results reported an increase in students' awareness of healthy eating, increased knowledge, and PA levels. Additionally, a decrease in perceived psychosocial barriers for all participants and a positive change in attitudes and social norms were observed. The literature confirms the use of life skills in effective school-based programs.

1.4. Aim of the Study

As several studies highlight that TPB is a well-documented framework for promoting healthy dietary behaviors (Baranowski et al., 2003) and PA (McEwan et al., 2019) the

strategies were based on the idea that students would acquire the knowledge and skills to make healthier dietary decisions and increase their PA. The hypothesis was that the students' post-intervention measures would reflect an increase in their knowledge of healthy eating, change their behavior regarding a healthy diet, and increase their PA levels. Overall, the program comprised 10 1 h sessions, which are described below.

Table 1. Description of the DIEX program

Table 1. Description of the DIEX program (sessions and activities).

Sessions	Contents	Activities
1st	Introduction of the program—Purpose of the program— Determine way of working —Initial evaluation	Students grouped—I learn about my body—What is BMI (Body Mass Index)?—What are metabolism and calories?—Students calculate their BMI—Communicate with significant others
2nd	What is a healthy diet—Macronutrients—Table with nutrient information—Food pyramid	Knowledge test of healthy diet—Create a food pyramid poster with a collage of images of foods—Learn to read food labels—Create a message about nutritive food
3rd	Lead causes of unhealthy diet—Consequences of poor diet—Eating disorders and their causes	Knowledge test of unhealthy foods—Analyze campaigns promoting the ideal body type—Create a message reflecting this session and communicate it to others.
4th	Obesity—Data from Hellenic Medical Society of Obesity—Physical and mental health effects of obesity—Childhood obesity data—The psychology of obesity	Demystification of the ideal body—Teamwork: "To what extent do we judge ourselves and others by our/their appearance"
5th	Diet—Restrictions on a diet—How mass media promotes unhealthy food products as healthy choices—Hidden messages—The effectiveness of a diet is related to psychology—The Forbidden Fruit Theory—How to monitor our eating habits	Personal assessment questionnaire—Interviewing a family member who makes effort to lose weight with no results—Keep a food diary—Create a message of the session
6th	Regular exercise and its importance—Research data of PA benefits in physical and psychological health—List of calories burned in 1 h of exercise	Knowledge test of the health benefits of exercise—Self-assessment questionnaire: "Why do I not exercise?"—Keep a PA diary—"Creating the curve of monthly PA"
7th	Changing our diet and PA habits—Reflection on our healthy and unhealthy behaviors—Assessment of eating behavior	Teamwork: "Create a balanced diet plan"—Complete a personal diet and PA diary—Step-by-step guidance for the goal-setting technique (Exercise behavior)—Create and communicate the message of the session
8th	Models of behavior change—Controlling our emotions—Introducing control strategies	Strategies for developing emotional intelligence—Regulate our emotions—Positive self-talk—Awareness —Role-playing—Controlling thoughts—Relaxation techniques—Modifying outcome expectations
9th	Setting goals for a healthy diet and regular exercise—Introduce goal-setting theory—What type of goals should I set?—Individual and team practice with the goal-setting skills for fitness issues	Step-by-step goal-setting technique (healthy diet behavior)—Overcoming obstacles to health (healthy dietary and exercise behavior)—Create the message of the session and communicate it to significant others
10th	Publication of the program to other students, teachers, parents, and others— Learn how to transfer knowledge to significant others	Organize a lecture by health experts (psychologists, nutritionists, and fitness trainers) and obtain information about health issues—Organize a celebration with a buffet of healthy foods using all of the information gathered—Exhibition of the material of the program (posters, photos, images, and messages) —Presentation

2. Materials and Methods

2.1. Participants

The participants were 367 students (168 boys and 199 girls; mean age: 16.02 ± 1.19 years) from 14 secondary schools across Greece that voluntarily participated in the DIEX program. In an attempt to recruit a representative sample, we promoted the DIEX program through advertisements on social media and emails. Participants were recruited using the snowball sampling method (SSM). Fourteen teachers enrolled voluntarily in the program by fulfilling a form of participation, indicating their willingness to participate, and used the

program's materials in class according to the researcher's guidance. Teachers informed students about the program. The inclusion criteria were being a high school student, 13–17 years old, willing to participate in the study, having parents' consent, and being able to read and complete the questionnaires on their own. The exclusion criteria were a lack of participation in the program and an incomplete questionnaire.

2.2. Instruments

The following scales were used for the assessment of the DIEX health education program:

Attitudes toward healthy eating. Five items were used to assess attitudes toward healthy eating (e.g., “*For me taking care of my diet is...*”). The answers were provided on a 7-point bipolar Likert scale with opposing words (e.g., good–bad, silly–clever, healthy–unhealthy, pleasant–unpleasant, and useful–useless).

Intention toward healthy eating. This was assessed with two questions (e.g., “*I intend to take care of my diet*”). Answers were offered on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Subjective norm. Two items incorporated the assessment of the subjective norm, e.g., “*Important people to me believe that I will take care of my diet*”. Participants' responses were provided on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived behavioral control. Two items assessed students' ability and capacity to control themselves regarding taking care of their nutrition, e.g., “*It depends on me If I take care of my diet*”. Answers were provided on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Attitudes toward the application of the program. Students answered one phrase “*For me, the program is ...*” and provided their responses on a 7-point Likert scale with opposing words (e.g., good–bad, attractive–unattractive, useful–useless, and pleasant–unpleasant).

Satisfaction with the program. This was assessed by the responses to six items (e.g., “*This program via the internet was easy to use*”) upon the completion of the intervention and the answers were provided on a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree).

Knowledge about healthy eating. A questionnaire was created to assess general knowledge of nutrition and diet based on previous studies by Hassandra et al, (2009) and Kolovelonis et al. (2016). It consisted of 20 items (e.g., “*Junk foods are highly processed and high in calories*” or “*Poor diet and lack of exercise are linked to cardiovascular disease*”) and was delivered before and after the implementation of the educational program. Students provided their responses on a 3-point Likert scale (0 = no, 1 = I am not sure, and 3 = Yes), and the final score ranged from 0 to 60.

Exercise behavior. Participation in regular exercise was assessed using a single item (“*How often do you usually exercise in your free time to the extent that you get out of breath or sweat?*”). The answers were provided on a 7-point Likert scale from 0 (never) to 6 (every day) (Booth et al., 2001). This item has already been used in studies with Greek participants (Kokkevi et al., 2004).

All measures were completed by the students before (pre-) and/or after (post-) the implementation of the DIEX health education program. Most of the instruments used in the present study were based on the TPB [Ajzen, 2002; 2006]. These TPB instruments have already been translated into Greek and applied in previous studies by Theodorakis (1994), Hassandra et al. (2009) and Kolovelonis et al. (2016).

2.3. Procedures

The present study examined the implementation of a school-based health education program promoting healthy diet and regular exercise in Greek secondary school students. The education program is based on the behavioral change theory, TPB, life skills education, and

the use of digital elements aiming to affect the process of educating and enhancing adolescents' lifestyles (exercise and dietary choices). The program's sessions included behavior-modification techniques, goal setting, stress management, problem-solving, and cognitive restructuring. Teachers had online access to the educational material of the program and implemented it through class sessions. Each student completed a pre-intervention and post-intervention online questionnaire on the website of the DIEX program. Participants were recruited by social media advertisements related to the health education program. The website of the program is <http://research.pe.uth.gr/nutrition/> (accessed on 28 March 2019). The distribution of the health education material through the program's official website enabled a large sample of participants from all over Greece. Initially, teachers, who were interested in implementing the program completed a form indicating their interest in taking part in the program. In total, 14 teachers and their secondary schools from different parts of Greece responded to this call. Students and their parents also provided informed consent before participating in the program. Teachers received usernames for each student to log in and answer the pre-intervention questionnaire. The prerequisite for gaining access to the material of each program was completing the pre-intervention questionnaires. After they gained access to the educational material of the program, teachers started to implement it. The program consisted of 10 sessions of one hour each. All material was downloadable, containing application instructions, a relevant bibliography, data from research on healthy diets and PA, PowerPoint presentations, tasks, ideas for experiential activities, games, appropriate teaching strategies and techniques and guidance for practicing them, topics for project work, relevant websites, and more. Upon the completion of the program, students reused their usernames and reevaluated the programs by responding to the post-intervention questionnaires. A certificate of attendance was provided to the teachers who implemented all of the sessions and motivated their students to complete the post-intervention measurement, along with the results of the evaluation. During

the implementation of the sessions, teachers were fully supported by the research team through e-mails and telephone communication.

2.4. Data Analysis

In each intervention, descriptive statistics (means and standard deviations) and the reliability index (Cronbach's α) were calculated for both measurements. Then, separate paired-samples *t*-tests with Cohen's *d* effect sizes were used in order to examine possible differences in the dependent variables (attitudes, intention, subjective norms, PBC, attitudes toward the program's application, knowledge, and behavior) pre- and post-intervention programs. All statistical analyses were conducted with IBM SPSS Statistics for Windows, version 26.0 (IBM Corp, Armonk, NY, USA). The *p*-value was set at 0.05.

Results

The results of the descriptive statistics, reliability index, and significant differences between pre and post-intervention measurements on the DIEX health education program are presented in [Table 2](#). More specifically, the paired-samples *t*-test revealed significant differences regarding students' attitudes toward the program's implementation ($t_{365} = -1.996, p < 0.05, d = 0.10$), knowledge ($t_{365} = -6.522, p < 0.001, d = 0.34$), and behavior toward a healthy diet ($t_{365} = -3.182, p < 0.01, d = 0.17$) between the pre-and post-intervention measures. Students reported higher scores for their attitudes toward the program's application, knowledge about healthy eating, and behavior toward healthy eating after the application of the DIEX health education program compared with their pre-intervention measures ([Figure 1](#), [Figure 2](#) and [Figure 3](#), [Table 2](#)). Students also reported that they were very satisfied with the application of the DIEX health education program ($M = 5.83 \pm 0.99$). Nevertheless, there were no significant differences in the students' attitudes toward healthy eating ($t_{366} = -1.502, p = 0.134$), intention toward healthy eating ($t_{366} = 0.736, p = 0.462$), subjective norm ($t_{366} =$

-1.764, $p = 0.079$), PBC ($t_{362} = -0.500$, $p = 0.618$), and exercise behavior ($t_{366} = 0.238$, $p = 0.812$).

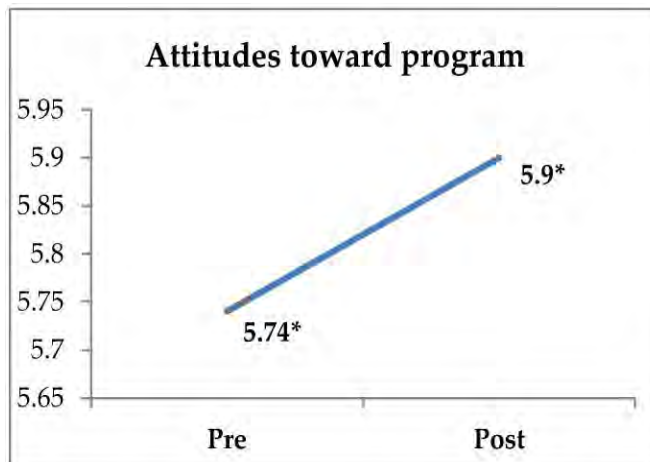


Figure 1

Differences between pre- and post-program measurements of attitudes toward the program's implementation (* $p < 0.05$).

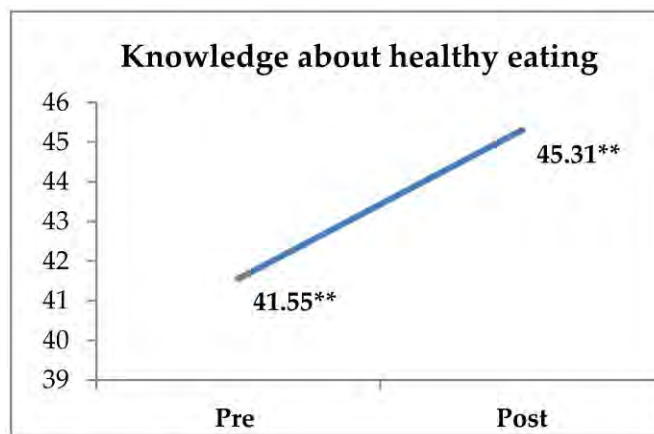


Figure 2

Differences between pre- and post-program measurements of knowledge about nutrition (** $p < 0.01$).

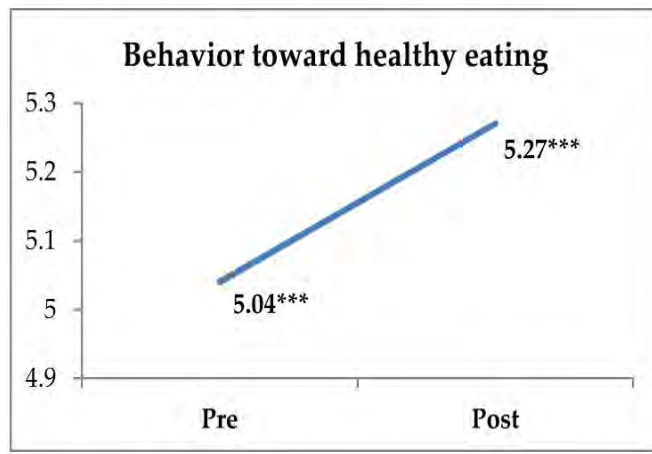


Figure 3

Differences between pre- and post-program measurements of nutritional behavior (***) $p < 0.001$).

Table 2

Descriptive statistics, reliability index, and significant differences between pre- and post-intervention measures for the DIEX health education program.

Variables	Pre-Intervention			Post-Intervention		
	A	M	SD	α	M	SD
Attitudes toward healthy eating	0.80	6.06	0.90	0.81	6.14	0.94
Intention toward healthy eating	0.77	6.22	0.98	0.90	6.17	1.16
Subjective norm	0.81	5.85	1.22	0.87	5.98	1.22
PBC	0.44	6.18	0.94	0.64	6.21	0.98
Attitudes toward the program *	0.82	5.74	1.02	0.56	5.90	1.48
Knowledge about healthy eating ***	0.74	41.55	9.21	0.79	45.31	11.26

Variables	Pre-Intervention			Post-Intervention		
	A	M	SD	α	M	SD
Behavior about healthy eating **	0.81	5.04	1.30	0.88	5.27	1.40
Exercise behavior	-	4.59	1.17	-	4.57	1.27
Satisfaction with the program	-	-	-	0.84	5.83	0.99

Note: M: Mean; SD: standard deviation; PBC: perceived behavioral control; α : Cronbach's alpha reliability index; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

4. Discussion

The purpose of the present study was to examine the effectiveness of a school-based educational program named DIEX in promoting healthy diet and exercise to secondary school students. In general, the application of the program was satisfactory. The results indicated that the strongest effect of the program was the students' improved knowledge ($d = 0.34$) about healthy eating followed by their satisfaction with the program implementation ($d = 0.10$). It seems that knowledge remains an easy goal to achieve by implementing such programs. Health education programs have a great impact on improving students' knowledge, which is in accordance with previous findings (Daher et al., 2021). The educational strategies that have been applied, such as lecturing, knowledge quizzes, and role-playing, seemed to have a great effect on students' knowledge and their satisfaction with the program. Undoubtedly, education in specific topics has been found to increase personal awareness and skills (Arlighaus & Johnston, 2021). It is interesting to note that there is a connection between knowledge about nutrition and dietary choices, but there are several factors that affect adolescents' dietary habits (Partida et al., 2018). Koca and Arcan, in their recent study, postulated that knowledge about healthy eating has been found to affect adolescents' dietary habits (Koca & Arkan, 2020).

Students reported very high scores in satisfaction with their participation in this program. These two measurements indicate that the online content of the programs satisfied students, who found it interesting, easy to access, and feasible to use. Incorporating new technologies and establishing internet school-based educational programs have been proven efficient support tools (Champion et al., 2013). This type of intervention has the advantages of being more interactive and more attractive to adolescents (do Amaral et al., 2017). In the same light, in a recent review by de Sousa et al. (2022), the effectiveness of incorporating such interactive elements in programs targeting adolescents is highlighted.

On the contrary, no significant differences were found in attitudes toward healthy eating. One potential explanation of this finding may be that attitudes toward the above behavior were already positive at the pretest. Furthermore, this could reveal the difficulties in forming personal attitudes and beliefs through a short-term intervention. Similar conclusions were reached by previous research (Watson et al., 2009). Upon further analysis, students reported significant positive attitudes toward the application of the program, demonstrating the need to incorporate such educational programs into the school curriculum.

Furthermore, their behavior toward healthy eating resulted in significantly higher post-test scores ($d = 0.17$). By comparing the results from Harrington et al. (2020) and Arrizabalaga-López et al. (2018), it seems that health education programs may positively affect participants' behavior toward healthy eating. Moreover, no significant differences were found in the subjective norm. In the study by Evans et al. (1995), adolescents perceived that their peers gave the lowest priority to healthy eating. With respect to PBC (adolescents' perception of their control of healthy eating behavior), it is interesting to note that students reported no difference in pre- and post-program measurements. PBC may not have directly affected healthy eating, as adolescents' choices regarding those behaviors are driven more by personal motivation than external control factors. However, this may demonstrate that adolescents feel less autonomous

in what they consume, compared with adults (Kothe & Mullan, 2015) as they do not live alone and their eating choices do not depend exclusively on them, but are affected by others (e.g., parents). Contrary to this finding, Mc Dermott et al. (2015) in their review, suggested that those who work with young peoples' behaviors should emphasize the PBC factor if they want to achieve an effective intervention. Subjective norms and intentions seemed to have the weakest effect on behavior. Subjective norms (what is perceived as socially approved and desirable) typically have a weakened relationship with the intention to perform a behavior (Jacob et al., 2021; Mann & Lohrmann, 2019). Regarding the exercise behavior variable, no difference between the pre- and post-test results was found. This result demonstrates that the exercise behavior rates were already high in the pre-intervention measurement (Kolovelonis et al., 2016) and the changes were minor. A possible explanation for this result could be the use of a single item to assess students' exercise behavior.

Limitations and Future Studies

A limitation of the present study was that students' behaviors were assessed by self-reported questionnaires. Thus, their answers might be affected by recall bias. In future studies, the assessment could be based on teachers' or parents' proxy self-reporting instruments, if possible, as parental involvement is suggested for more effective healthy diet educational interventions (McDermott et al., 2015). It is also vital to mention that the implementation of the present program and the results of the evaluation may contribute to the personal and professional development of the participating teachers or possible future ones. It is advisable for a teacher to be well-educated and informed on health education programs to implement them effectively (Jacob et al., 2021). The absence of a control group should also be noted, as this limitation may lead to unsafe conclusions regarding the causal effect of the present intervention treatment. Despite the aforementioned limitations, although effectiveness studies,

such as the present one, may sacrifice some internal validity, they have higher external validity than efficacy studies. The strengths of the current study were the combination of TPB components, life skills education, the use of technology, the use of theory-based questionnaires for data collection, and the use of a supportive booklet during the sessions' delivery.

5. Conclusions

Considering the results of this study, the most prominent evidence from the application of this educational school program is the knowledge factor. Furthermore, it was successful in changing attitudes toward the program and behavior toward a healthy diet, but not for subjective norms, perceived behavioral control, and intentions. In addition, students reported high scores in satisfaction with the program's application. These findings have great implications for healthy diet promotion interventions among young people, especially in Greek schools. A theory-driven and skill-improvement educational intervention was effective among adolescents.

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Chapter 3

Study 2

Implementation and evaluation of a school-based educational anti-doping program for Greek high school students

Abstract

The present study aimed to assess the effectiveness of a school-based educational program targeting to educate and change the behavior of Greek high school students toward doping use, named “*Doping destroys health and sports*” (DOSPO). The program was based on the Theory of Planned Behavior (TPB) principles and was assisted by life skills training. The participants were 65 students from five Greek secondary schools (27 boys and 38 girls; M_{age} : 15.07 ± 1.17 years). Before and after the program’s implementation, students completed online a number of well-established questionnaires measuring their intention, attitudes, subjective norm, perceived behavioral control (PBC) towards doping use and learning about doping, knowledge about doping, exercise behavior, attitudes, and satisfaction with the DOSPO program implementation. Results showed significant differences in students’ knowledge of doping use, their intentions to learn about doping use, and their attitudes toward the program’s implementation. Such results indicated the effectiveness of a theory-based, life skills-assisted educational school program on students’ knowledge and specific behavior variables, which may be proven promising for the development of future school-based health education interventions.

Keywords: Theory of Planned Behavior, doping, prevention, life skills, adolescents

INTRODUCTION

Doping, or the use of illegal performance-enhancing drugs (PEDs), has been well-known for decades. Doping is defined by the World Anti-Doping Agency (WADA), “*as the occurrence of one or more of the anti-doping rule violations*” outlined in Articles 2.1 to 2.10 of the World Anti-Doping Code (WADA, 2021). Doping in sports is under the control of the WADA, which is created to protect all athletes from doping and guarantee effective anti-doping educational programs to prevent doping (ADO Reference Guide, 2015). The prohibited substances and procedures athletes are not allowed to use, are included in WADA’s Prohibited List, which contains almost 400 substances, by the time mentioned, and is reviewed annually (WADA, 2022). Although PEDs are illegal and athletes are aware of it, 14-39% of elite athletes use drugs, intentionally, to enhance their performance (De Hon et al., 2015). Doping use can lead to serious physical health issues, as they can affect the cardiovascular system and the liver, cause diabetes and cancer, and hurt individuals’ mental health, as they have been linked to increased risk of suicide (Bird et al., 2016), low self-esteem (Lovstakken et al., 1999) and other mental and behavioral conditions, such as Muscle Dysmorphia (MD), in which the individual perceives his/ her physique as not adequately muscular or lean when instead, appears more muscular or lean than the average people (Pope et al., 1997; Skoufa et al., 2021).

On top of that, doping use has been recognized as a social issue (Timoshenko & Shiva, 2014). Given the fact, that society has undergone rapid changes in the system values, replacing moral ones, with wealth and success, as the ultimate values (Ahmadi & Svedsäter, 2016), many individuals use various types of means to increase their physical and mental performance (Breivik et al., 2009). Social pressure, the link between success factors, ideal body, self-confidence, and the emphasis the media place on the appearance of individuals, especially in younger age groups (Ahmadi & Svedsäter, 2016), elevating the use of doping to a significant social concern. According to literature, doping is used for aesthetic purposes, such as muscle

growth and a leaner figure, in recreational sports, gyms, and fitness centers (Barroso et al., 2008; Ehrnborg & Rosén, 2009; Reardon & Creado, 2014). Furthermore, it has been widely spread in various social contexts, such as academic context, known as “brain doping”, or “academic doping” (Franke et al., 2014; Lucke et al., 2011; McCabe et al., 2005) for cognitive improvement purposes, security, and military forces contexts (Whyte et al., 2021) for performance improvement. Besides, it has been linked with increased criminality levels and frequently leads to combined drug use and alcohol abuse (Skårberg, 2009). Indeed, doping use has penetrated several cultural and social contexts, with athletes’ attitudes and the general population’s being more comparable than one may anticipate (Breivik et al., 2009). It seems that the labor domain does not differentiate from the sports environment, where an increase in business performance level is a sign of success (Timoshenko & Shishova, 2014).

Doping use not only affects young athletes but has an impact on inactive students as well (Barkoukis et al., 2016). European School Project on Alcohol and other Drugs (Shah et al., 2019) reported that 1% of young students used PEDs. Throughout adolescence, attractiveness plays a crucial role, and adolescents often present a willingness to consider the dangers of substance use (Arnett, 2000; Steinberg, 2007). This could potentially result in intentional doping use, given that this delicate period is characterized by a mistaken body image (Stojanović & Radovanović, 2020).

Unhealthy behaviors often coexist (Noble et al., 2015). Smoking, eating disorders, frequent alcohol use, and other illegal drug addictions, are positively related to doping use (Irving et al., 2002; Pedersen et al., 2001; Shah et al., 2019). Relevant reviews have stressed that school-based programs can be effective in doping and using of banned substances in sports (Masala et al., 2019; Sipavičiūtė et al., 2020), as early doping prevention through school environment is favorable because they comprise athlete and non-athlete population (Pöppel, 2021).

Even though substantial investment by governments globally into the development of anti-doping measures, the incidence of doping use remains high among both elite (Elbe & Pitsch, 2018) and amateur athletes (Lazuras et al., 2017). Thus, it is urgent to develop effective interventions, emphasizing primary prevention (Pöppel, 2021) rather than detecting doping behavior. A growing body of literature suggests raising awareness and increasing education as a promising solution for preventing this risky behavior (Backhouse, 2015; Fares et al., 2021; Nicholls et al., 2017). Youth and adolescents constitute ideal groups for anti-doping initiatives, as attitudes and values are formed during adolescent years, and they tend to be more susceptible to normative social influence (Backhouse et al., 2012; Kohlberg & Hersh, 1977).

The decision to use PEDs is a complicated process involving motivation, beliefs, cognitions, and morality (Ntoumanis et al., 2014; Petróczi, 2007). Regarding adolescents, several studies have tried to examine the psychosocial factors that influence their intentions to use illegal performance-enhancing substances (PES) (Ntoumanis et al., 2014). An increasing body of research has focused on the psychological factors that affect athletes' usage of illicit substances to improve their athletic performance (Barkoukis et al., 2011; Ehrnborg & Rosén, 2009; Gucciardi et al., 2011; Ntoumanis et al., 2013). Social norms, attitudes towards doping, morality, and self-efficacy are linked to lower intentions to use illicit substances (Barkoukis et al., 2013; Hodge et al., 2013; Lucidi et al., 2008; Ntoumanis et al., 2014; Zelli et al., 2010). This declares that doping use is an intentionally regulated and goal-directed behavior (Connor et al., 2013; Gucciardi et al., 2011; Jalleh et al., 2014; Lentillon-Kaestner et al., 2012).

The Theory of Planned Behavior (TPB) (Ajzen 1991; 2012) has become a framework for predicting and preventing various health behaviors aiming to transform an unhealthy behavior into a healthy one (Baudouin et al., 2020; Delpia et al., 2016; Fertman, 2016; Fishbein & Ajzen, 2011). TPB (Ajzen, 1991) demonstrates that individuals' behavior is influenced by their intention to perform a specific behavior, which is driven by three factors: their attitudes towards

this behavior (evaluation of the behavior), subjective norm (their perceptions of significant others' beliefs on their ability to perform the behavior) and perceived behavior control (their perceptions on the ease or difficulty to execute the behavior). Cognitive and behavioral approaches are effective (Botvin et al., 1990; Yesalis et al., 2000). For example, in Bates et al. (2019) review, the most promising interventions consisted of behavior change techniques such as persuasion, goal setting, and providing information about health and social consequences, indicating that multifaceted interventions are more efficient.

Concerning doping behavior, research has adequately used TPB to explain the mental processes that guide individuals to doping use (Ntoumanis et al., 2013; Sipavičiūtė et al., 2020). For example, Ntoumanis et al. (2014) postulate that the most significant factors influencing the decision to use doping substances are the normative beliefs, the attitudes before doping use, and the previous use of legal performance-enhancing substances. Since attitudes and beliefs are established during childhood and early adolescence (Cieciuch et al., 2016; Döring et al., 2016), and intentions to doping use, are positively correlated to attitudes (Nicholls et al., 2017), an anti-doping educational program should emphasize on changing attitudes toward doping use. In support of this argument, several effective anti-doping interventions targeting adolescents, included moral and health messages in their sessions (e.g., Barkoukis et al., 2016; Elliot et al., 2008; Engelberg et al., 2015), as they have been found crucial preventive milestones for this age group.

For example, Jalilian et al. (2011) tested the effectiveness of a TPB-based intervention, among male young adults. The intervention was designed to supply refusal skills opposed to doping use, and provided educational content concerning the side effects of doping use and proper nutrition, aiming to enhance gym practices, without doping use. Resistance skills against doping use were improved; intention and knowledge about the side effects of doping use

reduced the rates of AAS usage in the intervention group. Participants' beliefs against doping use were modified, but the subjective norm and perceived behavioral control did not improve.

Antidoping education interventions targeting adolescents.

Although the prevalence of doping use is presented because of a lack of knowledge about the health consequences of this behavior (Masala et al., 2019), health education is not part of the Greek school's curriculum, not to say anti-doping education. WADA (2019) emphasizes education initiatives, highlighting them as the target purpose of the WADA code (WADA, 2021). Recommended education regarding the validity of anti-doping organizations has been proven effective in improving athletes' perceptions of their legitimacy (Henning & Dimeo, 2018; Woolway et al., 2020). Álvarez et al. (2019) assessed the effectiveness of a doping prevention school program, targeting adolescents which consisted of six sessions with results proving its effectiveness for doping prevention, by increasing students' knowledge, attitudes, and beliefs.

Literature suggests the application of theory-based educational interventions including new technologies for non-athletic adolescent groups (Daher et al., 2021). For example, Lucidi et al. (2017) tested the effectiveness of a cognitive theory-based, media literacy school intervention, educating students on how the media may diminish the moral consequences of doping to achieve greater control over media exposure (Potter, 2004). The program lasted six months and the results showed a decrease in students' attitudes concerning doping use. Similarly, Mallia et al. (2020) examined the effectiveness of a media literacy intervention, with effects on positive attitudes toward doping use, but a significant increase in students' self-efficacy in dealing with media influence.

Virtue ethics and overall wellness are crucial doping preventative milestones among adolescents. In a study of Barkoukis et al. (2016), students attended classroom sessions

emphasizing learning about prohibited substances and their side effects. Attitudes toward the use of legal substances were significantly negative in the intervention group, with no changes in attitudes toward doping use. In a recent study by Kavussanu et al. (2021) young athletes' doping susceptibility and doping likelihood were tested on a basis of two interventions, a “*moral*” intervention, and an education intervention. Both reduced the risk of doping, with results suggesting the addition of moral variables in an effective anti-doping educational intervention.

Doping behavior and life skills education

Life skills are defined by the abilities which enable individuals to successfully handle daily demands and pressures (WHO, 1997) and they are classified as physical, cognitive, and behavioral (Danish & Donahue, 1995). Those abilities can be learned, interactively, through teaching and practicing (Goudas, 2010), thus, interactive programs have been proven more effective than information-driven ones (Tobler & Stratton, 1997). Reinforcing healthy habits and preventing harmful behaviors are two main purposes of life skills education (Fallace et al., 2019), and particularly in adolescence, life skills education fosters health-related, self-regulation (Kirchhoff & Keller, 2021). Literature research highlights the effectiveness of life skills education through different contexts, such as sports (Papacharisis et al., 2005) and schools (Kirchhoff & Keller, 2021; Tiwari et. al., 2020). According to Kirchhoff and Keller's (2021) recent review, most life skills programs, among adolescents, were targeting substance use prevention, with most of them indicating positive effects in the long term (Spath et al., 2017). More precisely, the most effective were refusal, problem-solving and critical thinking skills, leading to self-efficacy resistance (Kirchhoff & Keller, 2021). For example, Botvin et al. (1990) applied a cognitive-behavioral intervention, among high school students. The conditions were distributed in peer-led and teacher-led interventions, with and without booster

sessions and a control group. Results indicated that this type of substance abuse prevention strategy, proved effective, especially when life skills teaching was implemented by peer leaders with booster sessions. Relevant reviews (Fallace et al., 2019; Hale et al., 2014), demonstrated that behavioral interventions, assisting with life skills education, have been proven effective in improving social, knowledge and competence skills.

Backhouse et al. (2014) classified the main successful doping prevention approaches: the knowledge-based approach, which emphasizes the side effects of doping use, life skills teaching (practicing social skills, refusal skills, decision making, improving self-efficacy, etc.), emotionally based (focusing on feelings of self-worth and self-esteem) and moral values approach. Similarly, Barkoukis et al. (2014) argued that anti-doping interventions should not focus only on promoting the risk factors of engaging in doping behavior but should include preventive approaches such as life skills teaching, emotion regulation techniques, and communication technologies. To the best of our knowledge, there is a lack of life skills school education programs targeting doping use prevention, exclusively.

Aim of the Study

The current study aims to evaluate the effectiveness of an antidoping school education program, based on the principles of the TPB with the assistance of life skills education. The program is based on the idea that students will require a broader knowledge of doping and its health consequences and would enable healthier lifestyle choices. The program includes the promotion of exercise behavior, values, and personal development skills acquisition (Pöppel, 2021). The hypothesis is that the students' post-intervention measure will reflect an increase in their knowledge about doping and improve students' average responses for TPB variables. This study examined the effectiveness of the implementation of a school-based health education program designed to educate and prevent doping use in Greek secondary school students. The

education program was named “*Doping destroys health and sports*” (DOSPO). It was based on the principles of TPB, life skills education, and the use of digital components aiming to improve their knowledge about doping use. The program consisted of 10 one-hour sessions which included behavior modification techniques, goal-setting, problem-solving, and cognitive restructuring methods.

METHOD

Participants

Participants of the DOSPO program were 65 students from five Greek secondary schools (M_{age} : 15.07 ± 1.17 years, 27 boys and 38 girls;). Students and teachers participated voluntarily. Participants were recruited using the snowball sampling method (Leighton et al., 2021). The DOSPO program was promoted through advertisements on social media and emails. PE teachers who were interested in implementing the program filled in fulfilled a form of participation, indicating their willingness to use the program’s material in weekly class sessions, assisted by researcher’s guidance. Teachers informed students about the program.

Eligibility criteria were being a secondary student, 12-16 years old, willing to participate in the study, having parents’ consent form, and being able to read and complete the questionnaires on their own. The exclusion criteria were the inability to complete program sessions, and an incomplete questionnaire. It is important to mention here that at the beginning of this intervention program, participants were 68 high school students, but for personal reasons, three of them (two boys and one girl) did not manage to participate in all sessions and dropped out from the post-intervention measurement (dropout rate: 4.41%).

Instruments

The TPB scales were developed, by Ajzen's (2002) recommendations, to capture students' attitudes toward doping, attitudes toward the program, intention to learn about doping, subjective norm, and PBC. All the instruments of the present study have previously been utilized in relevant school-based interventions with Greek participants (e.g., Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016).

Attitudes towards doping

Attitudes toward doping behavior were assessed by five items (e.g., "*For me doping is...*"). The responses ranged on a 7-point bipolar Likert scale (e.g., good-bad, healthy-unhealthy, useful-useless, and pleasant-unpleasant).

Intention to learn about doping

Two items incorporated the assessment of the intention to learn about doping (e.g., "*I intend to learn about doping*", "*I will try to learn about doping*"). Participants' responses were given on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Subjective norm

It was assessed with two items (e.g., "*Important people to me believe that I will learn about doping*", "*Key people in my life would like to be informed about doping*"). Answers were offered on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived behavioral control

Participants' competence to control themselves regarding what extent they will learn about doping use was captured with two items (e.g., "*It depends on me if I learn about doping*", "*It is my responsibility whether I am informed about doping*"). They answered on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Attitudes toward the application of the program

Under the following phrase “*For me the program is...*”, participants provided their answers on a 7-point Likert scale with bipolar words (e.g., good-bad, pleasant-unpleasant, attractive-unattractive, and useful- useless).

Satisfaction with the program

It was assessed with six items (e.g., “*This online program was easy to use*”), upon the completion of the intervention. Students answered on a 7-point Likert scale from 1 (totally disagree) to 7 (totally agree).

Knowledge about doping use

A 20-item questionnaire was created to assess general knowledge of doping use (e.g., “*Doping control is conducted by testing blood, urine and exhaled air*” or “*The use of some pharmaceutical substances that dope athletes can cause some forms of cancer in the long term*”) based on previous school-based health intervention programs (e.g., Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016). Participants’ answers were given on a 3-point Likert scale (0 = no, 1 = I am not sure, 2 = yes), and their scores ranged between 0-60.

Procedure

Initially, the present study was approved by the Bioethics Committee of the Department of Physical Education and Sport Science, University of Thessaly, Greece (Ref. Number: 653; Date: 12 December 2012). Also, at the start of the intervention, all students and their parents/guardians gave their consent to participate in it. The program’s material and the measures were administrated through the website <http://research.pe.uth.gr/health/>. Teachers who were interested in implementing the program fulfilled a form of participation. They were given access to the program’s materials, with the presumption that students would complete the pre-intervention questionnaires, using the usernames given. Upon the completion of the sessions, students reuse their usernames and reevaluate the program by responding to the post-

intervention questionnaires. A certificate of attendance was given to the teachers who implemented all the sessions and motivated their students to complete the post-intervention measurement, along with the results of the evaluation. The program consisted of downloadable material, containing application instructions, relevant bibliography, PowerPoint presentations, tasks, ideas for experiential activities, games, appropriate teaching strategies and techniques, topics for project work, relevant websites, and more. The program comprised 10 one-hour sessions, which are described below (Table 1).

Table 1. Description of the DOSPO program (sessions and activities).

Sessions	Contents	Activities
1 st	Introduction - Doping scandals - Side effects of doping - Doping control process - The importance of fair play	“Why do we participate in sports?” Antidoping images - “How an athlete feels when is caught doping?” - Antidoping messages
2 nd	Initial evaluation - Purpose of the program - General knowledge about doping - Comprehend the existence of rules in sport	Discussion about cases of athletes who used Performance Enhancing drugs - “Organize a match with and without rules” - Discuss our feelings about doping - Familiarize significant others (family) with the rules in sports.
3 rd	Ethics and values in sports - moral reward	Discuss the prize of the Olympic Games- definition significance of the victory - Create a message communicating values in sports - Teamwork: “gather information and create a poster about values in sports”
4 th	Assessment of doping knowledge	Knowledge test: “How is doping defined?” -

		“Discuss antidoping images and create a story using some of them”
5 th	Assessment of knowledge towards side effects of doping - Teaching life skills through drama	“Write down the term of doping” - Discuss pictures of acne caused by anabolic steroid use” - Drama play: “How does an athlete with side effects of doping behave? How do family, friends, and teammates treat him/her?” - Search for information: “What happens when children use illegal substances?”
6 th	Information about doping control process and regulations	“Interview an elite athlete: do athletes have the necessary knowledge about doping use? Which are their attitudes?”- Create a knowledge test about doping using online information - Create a poster with a message promoting healthy sports
7 th	What causes athletes to dope - social, economic, and psychological drives in doping - increased awareness- information	Discussion: “Is it certain for a doped athlete that he/she reaches the peak performance - does the risk outweigh the reward” - Find interviews of athletes who were doped.
8 th	How athletes feel when they are caught using PEDs - Practice the empathic process for a doped athlete (doping behavior)	How a doped athlete may feel? - Role-play: interviewing students acting out athletes who dope and athletes who they are "clean" - discuss and compare the answers
9 th	Body Dysmorphia - causes of body image disorders and gender differences - media, culture, and body dissatisfaction	Body image definition - social norms and body image - discuss pathological behaviors related to body image - discuss the evolution of body image through history by gathering evidence

10 th	Introduce the goal-setting technique - Define goal-setting technique - Overcoming Learn how to set individual goals - Practice obstacles to health (exercise behavior) - Interpret problem-solving skills on exercise problem-solving technique behavior
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Statistical analysis

The data analysis was conducted with IBM SPSS v 26.0. (IBM Corp, Armonk, NY, USA), while the level of significance was set at $p \leq .05$. Descriptive statistics (means, standard deviations) and Cronbach's α reliability index were calculated for both measurements. Additionally, separate paired samples t-tests were conducted, and Cohen's d effect size was calculated to capture possible differences in the examined variables (intention, attitudes, subjective norm, PBC towards doping use and learning about doping, knowledge about doping, attitudes and satisfaction towards the DOSPO program implementation) between pre- and post-intervention measurements.

RESULTS

Descriptive statistics (means, standard deviations) and Cronbach's α reliability index are presented in Table 2. All scales had acceptable reliability except PBC ($\alpha = .29$) and knowledge about doping ($\alpha = .58$) on pre-intervention measurement. However, despite these low reliability values, we decided to keep them for further statistical analyses. Tenenbaum et al. (2012) claim that a scale can display potentially low reliability due to a variety of internal (e.g., participants' personality characteristics, stress) and external factors, such as measurement conditions (e.g., time, place of completion, weather) and supervision that is provided by the researcher or the teaching staff. Field (2009) adds that due to the complexity and diversity that these scales

display, researchers should also anticipate reliability values lower than .70 when using psychological variables in their study.

The results for the DOSPO health intervention program showed significant differences in students' intention to learn about doping ($t_{64} = -1.991, p = .05, d = .24$), attitudes toward the program's implementation ($t_{64} = -2.856, p < .01, d = .35$), and knowledge about doping ($t_{64} = -6.232, p < .001, d = .76$) between pre- and post-intervention measurements. More specifically, after the implementation of the DOSPO health education program, students reported higher scores on intention to learn about doping, attitudes toward the program's implementation, and knowledge about doping compared to their pre-intervention measure (Table 2, Figures 1-3). Regarding students' satisfaction with the implementation of the DOSPO health education program, they also reported very high rates of satisfaction (Table 2). On the other hand, there were no significant differences in students' attitudes towards doping ($t_{64} = -.343, p = .733$), subjective norm ($t_{64} = -.674, p = .502$), PBC ($t_{64} = -1.217, p = .228$), doping behavior ($t_{64} = .441, p = .682$), and exercise behavior ($t_{67} = -1.725, p = .09$).

Table 2. Descriptive statistics, reliability index, and significant differences between pre and post-intervention measures on DOSPO health education program.

Variables	Pre-intervention			Post-intervention		
	<i>M</i>	<i>SD</i>	<i>α</i>	<i>M</i>	<i>SD</i>	<i>A</i>
Attitudes towards doping	1.62	.79	.84	1.65	.89	.80
Intention to learn about doping	*5.59	1.57	.97	5.96	1.13	.78
Subjective norm	5.36	1.56	.90	5.52	1.52	.96
PBC	5.67	1.40	.29	5.92	1.21	.79
Attitudes toward the program's implementation	**5.21	1.48	.84	5.73	1.26	.86

Knowledge about doping	***34.71	7.22	.58	43.22	9.28	.76
Doping behavior	1.58	1.02	.87	1.52	.98	.66
Satisfaction with the program	-	-	-	5.91	.82	.79

Notes. M: Mean; SD: Standard Deviation; α : Cronbach's α reliability index; PBC: Perceived Behavioral Control; * $p < .05$; ** $p < .01$; *** $p < .001$.

Discussion

The objective of the study was to assess the effectiveness of a school education program named “DOSPO”, targeted to improve knowledge, attitudes, and beliefs about doping. The recipients of the program were students and non-athletes from different Greek secondary schools. The results showed that the program highly influenced students' knowledge about doping, and intentions to learn about doping use, and had a significant positive effect on students' attitudes toward the program implementation. The significant improvement of this doping prevention education program in knowledge is consistent with previous health promotion studies in the school context (e.g., Angeli et al., 2022; Codella et al., 2019; Nicholls et al., 2020; Sagoe et al., 2016). Besides, research reveals that a lack of awareness about doping information, or knowledge obtained from unreliable sources affects adolescents' doping behavior (Duncan et al., 2018; Kim & Kim, 2017). Doping-related knowledge constitutes an important factor in preventing doping behavior as it has been proven to foster the development of protective traits such as healthier attitudes and beliefs (Königstein et al., 2021).

The knowledge effect holds great importance, as existing literature reveals that athletes have acknowledged the impact of insufficient doping education on their doping behavior (Backhouse et al., 2016; Hauw & Mohamed, 2015). Thus, an appropriate educational school program may build their resistance and refusal skills (Backhouse et al., 2016). However,

Álvarez et al. (2019) demonstrate the impact of anti-doping intervention on participants' knowledge but showed that certain information requires a longer period to be processed, questioning the feasibility of short time interventions. To conclude, knowledge acquisition through an educational intervention is important as it has been found to improve resistance and prevent doping behavior among adolescents (Allahverdipour et al., 2009; Chan et al., 2016).

Regarding their attitudes toward the program implementation, students appreciated and greatly welcomed the educational program. Indeed, they reported very high scores in satisfaction from their participation in the DOSPO program. These results confirm research findings that adolescents prefer more engaging and interactive programs which contain drama and role-playing more than merely informational content (Backhouse et al., 2012; Hallward & Duncan, 2019). The effectiveness of such interventions is increased when online training is combined with real-life interaction, offering adolescents the chance to acquire knowledge and skills independently (Elbe & Brand, 2016). Besides, the use of technology and the development of internet-based educational programs, with the addition of life skills and communication technologies, have been proven effective support strategies (Barkoukis et al., 2014; Champion et al., 2013).

In respect of students' intentions to learn about doping, results showed a significant increase ($d = .24$) in post-test results. Taking into account that intention predicts behavior, and stability demonstrates an important mechanism that regulates the intention-behavior relationship (Conner & Norman, 2022), students' intention to learn indicates that the intervention and the components of the program proved their effectiveness. Besides, according to relative metanalysis, effective interventions typically have an impact on intentions (Webb & Sheeran, 2006). Regarding attitudes, one potential explanation may be that they were already negative pre-test (mean score 1.62 in baseline, pre-intervention assessment). Consequently, the impact of the intervention was not a significant and observable improvement. However,

attitudes are proven to be the proximal factor to doping behavior among studies that excluded intentions (Jalleh et al., 2014). Yet, it is interesting to note that, in the study of Elbe and Brand, 2016, attitudes toward doping use increased in post-test results. The authors stated that participants had already developed opinions concerning doping use and realized that doping use is a complex result of cognitive processes and environmental conditions, and not a simple dilemma, based on ethical decision-making.

Despite the conceptual framework of TPB where attitudes, PBC, and subjective norms influence intentions, our data demonstrated that the DOSPO program could not improve students' PBC, subjective norms, and attitudes. We may attribute this to the lack of fidelity of implementation (FOI) (Li et al., 2021). Students' behavioral responses, such as motivation, engagement with the program's material, and satisfaction, are highly influenced by the teacher's role (Valero-Valenzuela et al., 2019). It is important to note that teachers who implemented the DOSPO program, did not have any specific training on how to apply the program's skills and strategies. Thus, the program's effectiveness may have been affected by students' insufficient responsiveness to intervention, or by a disparity between students' expectations and teachers' approach (McKenna et al., 2014). Fidelity assessment (Mowbray et al., 2003) enables a comprehensive evaluation of the degree to which students acquired the essential components of the program's material.

Regarding subjective norm appears to be the weakest predictor of intentions (e.g., Armitage & Conner, 2001; Lucidi et al., 2004; Mann & Lohrmann, 2019). Furthermore, the subjective norm is related to the injunctive norm (Fishbein & Ajzen, 2011), and strongly correlated to intention among adolescents (Rivis & Sheeran, 2003). In light of these, future studies should consider fidelity measurements, in order to validate the intervention's effectiveness and peer modeling, given that peer influence may facilitate the prevention of doping use (Barkoukis et al., 2019). Results, regarding subjective norm and PBC respectively,

agree with the findings of Jalilian et al. (2011) who found that the intervention did not have an impact on those variables. The authors attributed this null effect, to the lack of studies to improve the predictability of these variables.

In relation to doping behavior, there were no statistically significant changes. It is important to note that, sports motivation is proven to be a significant factor in doping behavior (Mudrak et al., 2018). Doping behavior is defined as the outcome of interactions between individuals and situations and not merely cognitive-based actions (Hauw & Mc Namee, 2015), this floor effect may be attributed to the fact that participants were high school students and non-athletes, consequently, were inexperienced with doping use, thus the intervention could not produce a behavioral change.

Conclusions

Concluding, the educational program improved students' knowledge, intentions to learn about doping, and attitudes toward the program's implementation. Importantly, the evaluation highlighted the students' willingness to be educated on this issue. Notwithstanding these important findings, some study limitations should be considered. Firstly, the collected data came from students' self-reported measures, which means that their answers might be affected by recall bias. The relatively small sample of participants, the absence of a control group, and the low reliability showed by a small number of instruments (PBC, knowledge) used in the present study should also be acknowledged. Furthermore, the lack of fidelity implementation may have an impact on program's effectiveness.

Due to the above-mentioned limitations, the findings of the present study should be interpreted with caution by future researchers. Future studies should consider fidelity measurements, to validate educational intervention effectiveness.

Conflicts of Interest

The authors declare no conflict of interest.

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Chapter 4

Study 3

The effectiveness of a behavioral change theory based educational program for preventing alcohol use among Greek adolescents – ALCoSPo “I Say No to ALCOhol - Yes to SPORts”: A pilot study.

Abstract

In this pilot study, we assessed the effectiveness and acceptability of an educational program designed to prevent alcohol-related behaviors among high school students. The program was rooted in the principles of the Theory of Planned Behavior and supplemented with life skills teaching. A total of 352 participants were involved, representing ten secondary schools in central Greece. Among these, 257 students (125 boys, 131 girls; one participant did not disclose their gender; Mean Age: 14.51 ± 1.34 years) constituted the experimental group, while 95 were assigned to the control group. The experimental group engaged in a 10-week program, with each session lasting for 1 hour. The results demonstrated significant enhancements in students' knowledge about alcohol, perceived behavioral control, and alcohol-related behaviors. Additionally, participants expressed high levels of satisfaction with the program. These findings offer substantial evidence for the practicality and effectiveness of an alcohol prevention initiative that is rooted in theory and supported by life skills education, when implemented within a school environment.

Keywords: pilot study, adolescents, alcohol prevention, Theory of Planned Behavior, life skills, behavior change

INTRODUCTION

The relationship between alcohol consumption and mortality has been well documented in the literature (Jayasekara et al., 2015; Kunzmann et al., 2018; Praud et al., 2016; White et al., 2020). Alcohol consumption constitutes an established risk factor for burden disease (GBD, 2017; Rehm & Imtiaz, 2016; WHO, 2019). Globally, an estimation of alcohol per capita consumption was 6.4 L in 2016, with a considerable increase recently (Mellinger, 2019). As reported by the World Health Organization (WHO), alcohol intake is associated with over 200 medical conditions (WHO, 2014), which include aggressive behaviors, psychosomatic issues, depressive symptoms, and poor academic performance (Bushman & Cooper, 1990; Li et al., 2020; Norell-Clarke & Hagquist, 2020). On top of that, alcohol is identified as one of the leading risk factors responsible for 40% of compromised well-being and untimely deaths in the European Union. On a global scale, injuries resulting from road traffic accidents are the foremost cause of mortality among individuals aged 15 to 29, encompassing teenagers and young adults (WHO, 2019).

Significant emphasis has been placed on analyzing the effects of alcohol consumption among young individuals (Foltran et al., 2011; Jacobus & Tapert., 2013; Zeigler et al., 2005). Underage drinking represents a major public health issue, globally (WHO, 2019), encompassing various negative outcomes such as dependence, premature death, and reduced work capacity. Underage drinking carries significant repercussions not only for the underage drinkers themselves but also for their families, communities, and society as a whole. It contributes to a myriad of costly health and social issues, with far-reaching consequences (Harding et al., 2016). In adolescence, involvement in alcohol consumption is associated with adverse educational outcomes, including bullying and social exclusion (OECD, 2022). Identifying risk factors in adolescents at an early stage can be beneficial in preventing or mitigating these risks (Lees et al., 2020; Spear, 2018). Europe has the highest rates of alcohol

abuse among youth, primarily due to its easy accessibility (Inchley et al., 2018). Greece maintains liberal cultural standards regarding alcohol, which is habitually used as a beneficial ingredient in regular daily life, rather than as a psychoactive substance on weekends, as is more distinctive in adolescents from northern European countries (Kraus & Nociar, 2016). During early adolescence, a critical phase of development emerges as the prime time for the initiation of alcohol consumption, which then advances into regular use and problematic drinking throughout mid-adolescence, later adolescence, and young adulthood (Chartier et al., 2010). In light of the above, it is suggested to develop preventive measures and raise awareness, as the initiation of drinking along with other risky behaviors, is more often among younger age people with a high probability of coexistence (Champion et al., 2019; Papadopoulou et al., 2017; Spring et al., 2012).

Regular physical activity represents an essential and supplementary protective strategy for various illnesses and conditions, as it has been found to improve cardiometabolic health, cognitive outcomes, and mental health (Bull et al., 2020). Various studies have proved the favorable connection between sports engagement and physical activity, against unhealthy behaviors (Thompson et al., 2018; Ussher et al., 2019), including the consumption of alcohol (Kristjansson et al., 2010; Terry-McElrath et al., 2011). For example, Villalba et al. (2016), found a positive correlation between engagement in physical activity and reduced levels of alcohol consumption levels among individuals.

Adolescence encompasses a wide-ranging period characterized by physical and behavioral transformations aimed at enhancing social, cognitive, and emotional abilities necessary for a smooth progression into adulthood. (Backes & Bonnie, 2019). Therefore, an escalating trend is evident within schools, as they try to promote healthy behaviors through complementary approaches, trying to comprehend the social determinants impacting health (Viner et al., 2012). Health education is a crucial preventive approach for determining

behavioral changes and establishing healthy behaviors (WHO, 2015). Indeed, it is crucial to introduce well-designed health education programs in schools, as they are considered an appropriate setting for such initiatives (Pulimeno et al., 2020). The current support of numerous alcohol interventions at a broader population level is based on diverse evidence concerning their efficacy. However, when it comes to interventions implemented in schools, the evidence is more varied and not as straightforward. (Martineau et al., 2013; Shackleton et al., 2016; Strøm et al., 2014). Therefore, it is crucial to develop and evaluate new interventions, to comprehensively synthesize the available evidence in a quantitative manner and arrive at more confident conclusions. (Dodd et al., 2022).

Health behavior growth and development, involving alcohol use and other risky behaviors, is increasingly being portrayed as a process that involves multiple phases (Armitage & Conner, 2000; Weinstein et al., 1998). For example, according to May et al. (2021), premature initiation of alcohol consumption seems to correlate with early commencement of pubertal maturation and the initiation of dating activities. The incorporation of theory, along with education, which is an essential component, in the development of health behavior interventions, has been shown to be more effective and facilitates the identification of relevant intervention goals (Arlinghaus & Johnston, 2018; Avery et al., 2013; Michie & Prestwich, 2010; Webb et al., 2010). Consistent with the above, for health intervention programs to be considered effective, they should be associated with psychological and cognitive abilities (Dir et al., 2017; Onrust et al., 2016). Those programs should follow a comprehensive approach guided by theory and focused on behavior change, targeting factors that impact health behavior, such as individual knowledge and attitudes toward a particular behavior (Daher et al., 2012; Kase et al., 2017; Shackleton et al., 2016).

Interventions promoting behavior change typically involve employing various bcts to modify or encourage a desired behavior. Behavior change techniques (BCTs) refer to the

“...observable, replicable, and irreducible component of an intervention designed to alter or redirect causal processes that regulate behavior; that is, a technique is proposed to be an active ingredient” (Michie et al., 2013, p. 82). Concerning alcohol use behavior, Black et al. (2016) meta-analysis, suggests using specific behavior change techniques (BCTs), such as prompting commitment, goal review, and feedback on performance. In a recent comprehensive meta-analysis conducted by Humphreys et al. (2021), a total of seven behavior change techniques (BCTs) were identified as highly influential within web-based interventions targeting alcohol misuse and other health behaviors. These BCTs encompassed problem-solving strategies, feedback mechanisms pertaining to behavior, self-monitoring practices concerning behavior and outcomes, instructional guidance on behavior performance, informative content regarding social and health consequences, as well as social comparison techniques. The results of the analysis indicated that these BCTs exhibited a notably high degree of effectiveness, representing the most frequently employed BCTs within the reviewed effective web-based interventions.

Theory of planned behavior and alcohol use.

Theory serves as a comprehensive and cohesive summary of the hypothesized causal processes that play a role in behavior change (Davis et al., 2015; Michie, 2008). According to research, the TPB is an evidence-based and rigorously scrutinized theoretical framework for analyzing and predicting goal-oriented human behavior (Fishbein & Ajzen, 2010). According to the TPB, individuals' behaviors are not exclusively below conscious oversight, and their behavior-related intention is established by three factors: attitude an individual's perspective regarding the behavior), subjective norm (perception of the social expectations to engage in the behavior), and perceived behavioral control (anticipated ability to perform out the behavior). Research findings have demonstrated its efficacy as a strategic approach to transform unhealthy behaviors into healthy ones (Angeli et al., 2022; Fertman, 2016), while also acting as a

preventive measure against deleterious behaviors such as alcohol consumption (Delpia et al., 2016). Moreover, it has been used as an effective framework for predicting intentions to engage in alcohol consumption and subsequent alcohol-related behavior (Cooke et al., 2016; Marcoux & Shope, 1997). For example, Zhao et al., (2020), examined adolescents' intention to consume alcohol, based on TPB extended framework that encompassed various social system influences. The final extended TPB model explained 60% of the variance in adolescents' intention to consume alcohol, with increased exposure to alcohol-related information exhibiting a modest yet noteworthy impact on adolescents' perceived behavioral control. Additionally, adolescents who had fewer friends engaged in alcohol consumption, more stringent parental regulations regarding alcohol, and unfavorable parental attitudes towards alcohol use were linked to stronger anti-alcohol attitudes and subjective norms among adolescents. In Luecha's et al. (2023) recent study, the TPB was employed to elucidate the patterns of alcohol consumption among young adolescents. According to findings, attitude and subjective norms exert significant influence on underage drinking. Enhancement of adolescents' life skills, self-esteem, and alcohol refusal skills was suggested in order to modify young people's intentions regarding alcohol consumption.

Recent investigations that have employed the TPB within the context of school-based interventions have identified variations in certain elements of alcohol behavior. Based on literature research, Kim et al. (2023) have developed the latest alcohol prevention program for early adolescents, which is grounded in the TPB principles and delivered through an online platform. The program spanned a duration of five weeks, comprising a total of five sessions, each lasting approximately 40 minutes. Improvements were observed in attitudes, PBC, and intention to engage in alcohol-prevention behaviors while subjective norm remained unchanged.

Norman et al. (2019) examined the effectiveness of a motivational intervention, involving the dissemination of messages aimed at targeting TPB constructs, in conjunction comprising instructions to create implementation intentions, in diminishing the occurrence of binge drinking among late adolescents. The participants who received the intervention messages exhibited reduced intentions in binge drinking, along with diminished attitudes, subjective norms, and self-efficacy associated with binge drinking, in comparison to those who did not receive the intervention messages.

Alcohol behavior and life skills teaching.

Literature findings confirm that comprehensive prevention approaches for alcohol consumption among adolescents include policy development and enforcement, public awareness and education initiatives, early intervention, and referral programs for alcohol-related concerns (Harding et al., 2016; Kemper et al., 2016). Adolescence is a vulnerable period during which, young individuals are highly inclined towards experimentation, driven by curiosity, susceptible to peer pressure, prone to rebellion against authority, and often experience low self-worth (Nawi et al., 2021). For example, female individuals exhibit higher susceptibility to stress, depression, and other internalizing behaviors, while gender role stereotypes may pose a greater risk factor for males. However, social peer influences play a significant role in shaping the behavior of both genders (Dir et al., 2017). Accordingly, effective interventions are those which integrate components of skills-building, motivational support, and personalized normative feedback (Dir et al., 2017; Henson et al., 2017; Nawi et al., 2021).

Life skills confer the necessary abilities that serve as a foundation for the demonstration of positive behaviors, and they can be facilitated through interactive methods of teaching and practical application (Goudas, 2000; Kirchhoff & Keller, 2021). These skills empower individuals to fulfill their social role responsibilities, build supportive social relationships,

navigate the demands and expectations of others, and effectively handle daily interpersonal challenges without causing harm to themselves or others (WHO, 1997). Individual traits such as self-control, a high level of mindfulness, strong beliefs against substance abuse, the motivation to maintain good health, school connectedness, and engagement in structured activities can work as protective factors against alcohol prevention (Dudok et al., 2023; Nawi et al., 2021; Nelson et al., 2017). While behavioral issues, diminished perception of misconduct, association with delinquent peers, and impulsivity work as risk factors during adolescence (Isaksson et al., 2020; Nelson et al., 2017). Empirical evidence substantiates the efficacy of life skills education in facilitating the acquisition of knowledge and fostering critical reflection on matters related to health, by delving into their interests, preferences, beliefs, values, social identities, and attitudes (Flay et al., 2009; Immordino-Yang et al., 2019; Kirchhoff & Keller, 2021). When it comes to alcohol behavior and life skills interventions targeting adolescents, the literature confirms their effectiveness rendering them viable options for policymaking and implementation (Agabio et al., 2015; Foxcroft & Tsertsvadze, 2012; Lemstra et al., 2010). In a study conducted by Giannotta and Weichold (2016), the effectiveness of a life skills educational program (IPSY: Information + Psychosocial competence = Protection), designed to prevent alcohol use among European adolescents was evaluated. The findings demonstrated that the program successfully influenced attitudes, personal competencies, and alcohol use. Suggesting that life skills-based programs could serve as valuable tools for preventing risk behaviors among adolescents in a broader European context. In a relevant context, with a particular focus on investigating the moderating impact of gender, Weichold et al. (2014) explored the effectiveness of IPSY and determined that the integration of life skills emerged as a successful component for preventing alcohol use, for both boys and girls during the early adolescent phase.

Research advocates the interpersonal and emotional components as the most robust correlations with the overall effectiveness of health interventions (Singla et al., 2017), such components include the implementation of life skills, regulation of emotions, and education on alcohol use (Skeen et al., 2019), in the terms of deliberations regarding the hazards associated with the consumption of illicit drugs, societal influences linked to alcohol use, legislative measures to alcohol use (Gabrhelik et al., 2012; Newton et al., 2014; Spoth et al., 2013) and educating adolescents on alternative methods of alcohol consumption that are less harmful or teaching them strategies to mitigate risks for themselves and others (Newton et al., 2014; Vogl et al., 2009). It is important to mention that providing tailored education, which means, focusing on increasing personal awareness of the reasons behind the need for change and providing training on the necessary steps to implement the change, can effectively facilitate behavioral transformation (Arlinghaus & Johnston, 2018). The inclusion of media-based elements frequently utilized by adolescents can potentially enhance the overall efficacy of the program (Hackman & Knowlden, 2022). Besides, the literature proposes integrating effective prevention principles, such as the utilization of theory and behavior change techniques in web-based interventions for health behavior (Van Genugten et al., 2016; Webb et al., 2010). Active collaboration with both adolescents and teachers should be promoted to further enhance this combination (Champion et al., 2019).

Acknowledging all the above, we decided to implement and evaluate the effectiveness of a behavior change, theory-based school educational program based on the principles of TPB assisted with life skills teaching, aiming to prevent alcohol use among adolescents.

Aim of the study

The aim of this study was to evaluate the effectiveness of the AlcoSPo intervention. A prevention school educational program, based on the theoretical framework of the TPB, supplemented by the integration of life skills education.

It is hypothesized that the experimental group will significantly improve their attitudes, intentions towards alcohol, their subjective norm, PBC and their alcohol behavior in comparison to the control group. Moreover, students of the experimental group will report high levels of satisfaction with the program and improved attitudes toward the program implementation.

Description of the intervention

The program's theoretical component, targets cultivating a healthier lifestyle, by adopting a TPB - based program design, life skills training, promoting physical activity as a health-protective element, and educating about alcohol-related issues. The educational intervention comprises self-regulation strategies, alcohol-related research data, kinetic games, trivia, self-assessment quizzes, drama play scenarios, discussion, and group activities. The education program was named "Say No to ALCOhol, Yes to SPORts" (ALCOSPO), and it consisted of 10, one-hour sessions. Sessions' components were accessible to participants through the program's website: <http://research.pe.uth.gr/alcohol/>. Programs' sessions focus on knowledge transfer processes, such as group discussion, modelling, behavior rehearsal, feedback, reinforcement, and behavioral 'homework' for out-of-classroom practice, on multiple methods of awareness-raising, interaction, and experiential approach to alcohol-related health issues. The program was universal, which indicates that it was offered to all high school students, irrespective of their risk of alcohol use.

METHOD

Participants

Participants were ($N = 257$) students from ten schools in central Greece. They voluntarily participated in this school-based health educational program named *ALCOSPO* (*say no to ALCOhol, yes to SPORts*). One hundred and twenty-five of them were boys, while 131 were girls (one participant did not report his/her gender), aged 13 to 18 years old ($M_{age}: 14.51 \pm 1.34$ years). There was a total of 204 students enrolled in secondary school, with 53 of them specifically attending high school. Seven out of ten schools (six secondary schools and one high school; $N = 162$ students) served as the experimental group (under the guidance of their teacher, students in the experimental group attended ten one-hour online sessions related to alcohol prevention), while the remaining three (two secondary schools and one high school; $N = 95$ students) served as the control group (teachers followed their regular program). Furthermore, a power analysis was performed to check whether the sample size of the present study was appropriate. Based on an a priori power analysis with G*Power program version 3.1 (Faul et al., 2007), a sample size of 58 participants was proposed for a Wilcoxon signed rank test, while a sample size of 288 (144 in each group) was proposed for a Mann-Whitney U test (two groups). These calculations were based on an expected effect size of .34, a power of .80, and a p value of less than .05 (e.g., Faul et al., 2007; Uttley, 2019). Consequently, the sample size for this study ($N = 257$ for both measurements) either exceeded or came close to the required number of participants to achieve statistically significant results with acceptable statistical power. It is important to mention here that the selected effect size (.34) was based on a previous meta-analysis of 17 school-based intervention programs of alcohol prevention among adolescents (Hennessy & Tanner-Smith, 2015).

Instruments

The TPB scales, based on Ajzen's (2002) guidelines, were designed to assess student's attitudes and intentions toward alcohol, subjective norms, PBC and attitudes toward the program. The present study employed questionnaires that had been previously used in similar studies, in Greek language, assessing the efficacy of interventions implemented within educational settings. (e.g., Angeli et al., 2023; Angeli et al., 2022; Kolovelonis et al., 2016).

Attitudes towards alcohol

Five items were utilized to evaluate attitudes towards alcohol (e.g., *For me drinking alcoholic beverages is...*). Participants were requested to provide their responses on a 7-point bipolar Likert scale (e.g., good-bad, healthy-unhealthy, useful-useless, and pleasant-unpleasant).

Intention to consume alcohol

The evaluation of intention towards alcohol encompassed the integration of two specific items (e.g., *"I plan to drink alcoholic beverages in the coming months"*, *"I will try drinking alcoholic beverages"*). Participants provided their responses on a 7-point Likert scale, spanning from 1 (indicating strong disagreement) to 7 (indicating strong agreement).

Subjective norm

The assessment of subjective norm was conducted through the utilization of two items (*"People important in my life believe that I will drink alcoholic beverages"*, *"Great people in my life will like me to drink drinks with alcohol"*). Participants provided their answers on a 7-point Likert scale, ranging from 1 (representing strong disagreement) to 7 (representing strong agreement).

Perceived behavioral control (PBC)

Two items were used to assess participants' perceived competence in exerting control over their alcohol consumption (*"It's entirely up to me whether I drink alcoholic beverages in*

the coming months”, “*It is my responsibility if I drink alcoholic beverages in the coming months*”). They provided their responses on a 7-point Likert scale, ranging from 1 (strongly agree) to 7 (strongly disagree).

Attitudes towards the program's implementation

Within the context of the prompt “*For me, the program is...*”, participants were requested to express their responses using a 7-point Likert scale encompassing bipolar word pairs (e.g., *good-bad, pleasant-unpleasant, attractive-unattractive, and useful-useless*).

Satisfaction with the program

The experimental group's satisfaction with the program was evaluated following the completion of the intervention, utilizing six items (e.g., “*Using this program via computer and the internet was easy*”, “*Using the computer and the internet through this program was easy*”, “*I prefer to learn about such issues via the computer and the internet, rather than from a book*”, “*I am satisfied with the texts in this program*”, “*I am satisfied with the design of this program*”, “*I am satisfied with the images I saw in the program*”). Participants responded on a 7-point Likert scale, ranging from 1 (indicating complete disagreement) to 7 (indicating complete agreement).

Knowledge about alcohol

A questionnaire consisting of 20 items was developed to measure participants' knowledge pertaining to alcohol (e.g., “*Alcohols are organic chemical compounds that can be used in beverages, for medicinal purposes, as fuel, as a base for antifreeze liquids and as a solvent for various substances such as perfumes, dyes and medicines*”, “*Alcohol is classified as a suppressive drug because it slows down the vital functions of the body*”, “*In Greece, laws prohibit the sale of alcoholic beverages to young people under the age of 18*”, “*alcoholic drink*” means a drink containing ethyl alcohol of agricultural origin in any proportion and which has been obtained either by natural fermentation or by addition during processing”,

“Whisky, gin, vodka, cognac, rum usually contain 40% pure alcohol”, “The more alcohol a person consumes, the higher the concentration of alcohol in their blood”, “In the long term, students' drinking will affect their school performance, social life, friendships and general health” ...).

The questions incorporated into the questionnaire draw upon the project material and are grounded in prior school-based health intervention programs (e.g., Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016). Participants' responses were collected using a 3-point Likert scale, where the options ranged from 0 (indicating *"no"*) to 2 (indicating *"yes"*), with an additional option of 1 (indicating *"I am not sure"*). The total scores achieved by participants ranged from 0 to 60.

Alcohol behavior

Alcohol behavior was evaluated through a composite approach that involved assessing both the frequency of alcohol and quantity of alcohol intake (Gruenewald et al., 1996) and utilizing the short-term recall method as described by Rehm et al., (1998). This methodology aligns with the proposed core outcome set for brief alcohol intervention (Shorter et al., 2019). Under the steam *“In the past month, how many times have you had an alcoholic drink?”*).

The response options were categorized into a numerical scale representing different levels of alcohol behavior. The scale was defined as follows: 1 indicated *"Not at all"*, 2 indicated *"Once"*, 3 indicated *"2-3 times"*, 4 indicated *"1 or 2 times a week"*, 5 indicated *"3 or 4 times a week"*, 6 indicated *"5 or 6 times a week"*, 7 indicated *"Almost every day"*, and 8 indicated *"Every day"*. The other item used, was a single question (*“During the past month, how many alcoholic drinks did you usually consume each time you drank?”*). Participants' responses were provided according to the following scale: 1 – *“I did not drink any alcohol last month”*, 2 – *“I consumed 1 drink”*, 3 – *“I consumed 2 drinks”*, 4 – *“I consumed 3 drinks”*, 5 –

“I consumed 4 drinks”, 6 – “I consumed 5 drinks”, 7 – “I consumed 6 drinks”, and 8 – “I consumed 7 or more drinks”.

Procedure

The study obtained ethical approval from the Bioethics Committee of the Department of Physical Education and Sport Science, University of Thessaly, Greece. In addition, prior to the intervention, informed consent was obtained from all students and their parents, indicating their voluntary agreement to participate in the study. In the context of the intervention program, the dispersal of program materials and assessment measures took place through the online platform <http://research.pe.uth.gr/alcohol/>. The program was promoted through social media channels and communicated to secondary schools across different cities in Greece through email correspondence. Teachers who demonstrated interest in offering the program's sessions completed an online participation form, following which they were granted access to the program's materials. It is worth mentioning that the teachers in charge of facilitating the program sessions did not undergo any specialized training for this particular task. The participants were randomly assigned to either the experimental group or the control group and provided usernames to complete the pre-intervention questionnaires. Students in the experimental group engaged in ten one-hour online sessions of the program, whereas the control group completed the pre-intervention questionnaires and, after a period of ten weeks, completed the post-intervention questionnaires. It is noteworthy that the schools in the control group were provided access to the educational materials of the ALCOSPO program upon the conclusion of the intervention.

The program's total duration extended over a period of three months and instructors who successfully conducted all the sessions and encouraged their students to complete the post-intervention measurements were awarded a certificate of attendance and their evaluation

results. Out of the nine teachers involved, seven successfully conducted all of the program sessions and administered the post-intervention questionnaires. The program encompassed a comprehensive set of downloadable materials that included application instructions, relevant bibliography, PowerPoint presentations, tasks, ideas for experiential activities, videos, games and project work topics. Table 1 provides a detailed description of the contents, activities, and techniques employed within the program.

Table 1. Description of the ALCOSPO program

Sessions	Theoretical Construct	BCT	Contents	Activities
1 st	Attitudes Knowledge	Shaping knowledge Natural consequences	Initial Evaluation – General knowledge about alcohol – Definition of alcohol – Learn more information about alcohol – Definition of Blood Alcohol Concentration/Preconcentration (BAC)	Quiz: “What do you know about alcohol?” – Different types of alcohol, alcoholic beverages, and amounts of alcohol they contain.
2 nd	Education Perceived behavioral control Attitudes Knowledge	Shaping knowledge Feedback on behavior Comparison of outcomes	Units of alcohol and how to calculate them – Definition of Responsible drinking – How do you calculate Blood Alcohol Concentration (BAC)	“What is an alcohol unit?” – Worksheet: “How many units are in alcoholic drinks?” – Discussion: “What are the benefits of being alcohol-free?” – Discuss; “Which factors affect Blood Alcohol Concentration levels”
3 rd	Subjective norm Perceived behavioral control Intention Life-skills	Motivational interviewing Goal setting Monitoring of behavior Action planning pros and cons Decisional balance	Participants’ incentives and decisions about whether they consume or not alcohol – Introduction to goal-setting technique	Interview an adult family member: “Why do people drink” – Worksheet: “The decision to use or abstain from alcohol” – Practicing refusal skills – Creating a goal scale

4 th	Subjective norm Attitude Life-skills	Shaping knowledge Demonstration of the behavior Information about health consequences	Effects of alcohol consumption – “Alcohol and your body - What you need to know” – Alcohol and your brain - Liver and alcohol - Fetal Alcohol Syndrome	Knowledge test: “The effects of alcohol on our bodies” – Kinetic game: “The rotten liver”
5 th	Perceived behavioral control Attitudes Life-skills	Salience of sequences Information about others’ approval Problem-solving	How does alcohol affect behavior – Social effects of alcohol?	Knowledge test: “Behavioral effects of alcohol” – Working in pairs: “What is the impact?” – “Choices and Implications” – Decision-making game
6 th	Life-skills	Natural consequences Problem-solving Repetition and substitution	The unpleasant side of excessive drinking, the stages of drunkenness, and the consequences of alcohol abuse	Group discussion: “Which are the signs of alcohol abuse” – Brainstorming: “Easy ways to have fun without alcohol” – Myth or Fact Quiz: “Alcohol abuse”
7 th	Perceived behavioral control Attitude Life-skills	Pros & Cons Decisional balance Self-belief (verbal persuasion about capability)	Physical activity as an alternative to drinking alcohol	Worksheet: “Exercise: Should or Shouldn’t” – The Activity Pyramid – Overcoming obstacles to exercise frequently (Exercise behavior)
8 th	Subjective norm Life-skills Knowledge	Social comparison Mental rehearsal of successful performance	Alcohol and driving - What skills are needed to drive	Classify alcohol effects on the body – Drama play: social drinking– “How much alcohol is appropriate” – Matching quiz: “Alcohol consumption: Finding the balance”
9 th	Perceived behavioral control Attitudes Life-skills	Information about antecedents Provide healthy alternatives Comparative imagining of future outcomes	Discuss and create possible scenarios about alcohol - Practicing refusal skills to avoid dangerous situations – Discuss attitudes towards parties and alcohol consumption	Teamwork: “Develop a campaign against drink driving” – Discussion: “What really constitutes a successful party”

10 th	Life-skills	Feedback and monitoring	The negative effects of drinking	Work in groups: “Analyzing an
	Subjective norms	Provide healthy	alcohol compared to its enticing	advertisement for alcoholic
	Perceived behavioral control	alternatives	image – Raising awareness of the	beverages” – Kinetic team game:
			harm that can be caused by alcohol	“The proliferation of alcohol”
			and the benefits of exercise	
			Alcohol-related advertisements	

Data analysis

All statistical analyses were conducted with IBM SPSS v 26.0 (IBM Corp, Armonk, NY, USA). The level of significance was determined at $p \leq .05$. For both measures, descriptive statistics (means, standard deviations), as well as Cronbach's alpha reliability index, were computed. The Kolmogorov-Smirnov test was used to explore the normal distribution of the data. Results showed that none of the examined variables were normally distributed ($p < .05$). Thus, non-parametric tests were used to examine possible differences on the dependent variables within and between groups. To investigate potential differences between the experimental and control groups on various dependent variables (including attitudes towards alcohol, intentions, subjective norms, PBC, attitudes towards the program's implementation, knowledge about alcohol, and alcohol behavior), separate Mann-Whitney U tests were utilized. Then, Wilcoxon signed rank tests separately for the experimental and the control groups were calculated to examine possible differences on the dependent variables between pre and post-intervention measurements, respectively.

RESULTS

Descriptive statistics (means, standard deviations) and reliability index between pre- and post-intervention measures on the school-based health educational program for the prevention

of alcohol consumption are presented in Table 2. All variables revealed acceptable internal consistency in both measurements (Cronbach's alpha ranged from .71 to .93). Students at the experimental group reported that they were very satisfied with the implementation of the ALCOSPO educational program in their school ($M = 5.66 \pm 1.19$).

Table 2. Descriptive statistics (means, standard deviations) and reliability index between pre and post-intervention measures on ALCOSPO school-based health educational program.

Variables	Pre-intervention			Post-intervention		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	<i>A</i>
Attitudes towards alcohol	2.65	1.50	.93	2.53	1.49	.93
Intention to consume alcohol	2.51	1.79	.92	2.44	1.75	.89
Subjective norm	2.39	1.67	.79	2.40	1.76	.83
PBC	5.14	1.91	.71	5.34	2.02	.90
Attitudes toward the program's implementation	5.69	1.41	.89	5.78	1.29	.89
Knowledge about alcohol	29.33	6.89	.86	31.72	9.68	.91
Alcohol behavior	2.06	1.45	.82	1.63	1.22	.86
Satisfaction with the program	-	-	-	5.66	1.19	-
<i>M</i> : Mean; <i>SD</i> : Standard Deviation; PBC: Perceived Behavioral Control; α : Cronbach's alpha reliability index.						

Results from separate Mann-Whitney *U* tests on pre-intervention measurements revealed significant differences on students' attitudes towards alcohol ($U = 3.387, p < .001$), intentions to consume alcohol ($U = 4.120,50, p < .001$), subjective norm ($U = 3.517,50, p < .001$), PBC ($U = 6.277,50, p < .001$), and alcohol behavior ($U = 4.673,50, p < .001$) between experimental and control groups. More specifically, control group had higher scores in all the aforementioned variables compared to the experimental group at the pre-intervention measurement (Table 3). No significant differences emerged on pre-intervention measurements

on students' knowledge about alcohol between experimental and control groups ($U = 5.693, p = .494$).

Similarly, results from Mann-Whitney U tests on post-intervention measurements showed significant differences on students' attitudes towards alcohol ($U = 3.074, p < .001$), intentions to consume alcohol ($U = 4.161,50, p < .001$), subjective norm ($U = 3.173, p < .001$), knowledge about alcohol ($U = 3.967,50, p < .001$), and alcohol behavior ($U = 3.617, p < .001$) between experimental and control groups. More specifically, experimental group had lower scores in attitudes towards alcohol, intentions to consume alcohol, subjective norm, and alcohol behavior compared to control group (Table 3). In contrast, the experimental group reported higher scores on knowledge about alcohol compared to control group. No significant differences emerged on post-intervention measurements on students' PBC between experimental and control groups ($U = 6.704,50, p = .194$).

Furthermore, results from Wilcoxon signed rank tests only for the control group revealed no significant differences on students' attitudes towards alcohol ($Z = -.774, p = .439$), intentions to consume alcohol ($Z = -.424, p = .671$), subjective norms ($Z = -.728, p = .467$), PBC ($Z = -1.423, p = .155$), knowledge about alcohol ($Z = -1.455, p = .146$), and alcohol behavior ($Z = -1.332, p = .183$) between pre and post-intervention measurements (Table 3).

Finally, results from Wilcoxon signed rank tests only for the experimental group revealed significant differences on students' PBC ($Z = -3.097, p < .01$), knowledge about alcohol ($Z = -7.002, p < .001$), and alcohol behavior ($Z = -5.076, p < .001$) between pre and post-intervention measurements. More specifically, students at the experimental group reported higher scores on PBC and knowledge about alcohol on post-intervention compared to pre-intervention measurement (Table 3). In contrast, students at the intervention group reported lower scores on alcohol behavior on post-intervention compared to pre-intervention measurement (Table 3). No significant differences emerged between pre and post-intervention measurements for the

control group on attitudes towards alcohol ($Z = -1.519, p = .129$), intentions to consume alcohol ($Z = -.618, p = .536$), subjective norm ($Z = -.986, p = .324$), and attitudes toward program's implementation ($Z = -1.327, p = .184$).

Table 3. Descriptive statistics and significant differences within and between groups on the examined variables.

		Pre		Post	
Groups		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Control	Attitudes towards alcohol	3.58 ^a	1.56	3.53 ^f	1.68
	Intention to consume alcohol	3.48 ^b	2.02	3.44 ^g	2.09
	Subjective norm	3.42 ^c	1.85	3.60 ^h	1.96
	PBC	5.57 ^d	1.51	5.26	1.76
	Attitudes toward the- program's implementation	-	-	-	-
	Knowledge about alcohol	28.56	8.42	27.45 ⁱ	10.67
	Alcohol behavior	2.74 ^e	1.74	2.27 ^j	1.77
Experimental	Attitudes towards alcohol	2.11 ^a	1.17	1.97 ^f	1.02
	Intention to consume alcohol	1.94 ^b	1.36	1.87 ^g	1.20
	Subjective norm	1.80 ^c	1.22	1.71 ^h	1.18
	PBC	4.90 ^{d,k}	2.06	5.39 ^k	2.16
	Attitudes toward the- program's implementation	5.69	1.41	5.78	1.29
	Knowledge about alcohol	29.89 ^l	5.48	33.98 ^{i,l}	8.30
	Alcohol behavior	1.66 ^{e,m}	1.08	1.37 ^{j,m}	.76

M: Mean, *SD*: Standard Deviation, PBC: Perceived Behavioral Control; Pre: Pre-intervention measurement; Post: Post-intervention measurement; ^{a, b, c, d, e} Significant differences on pre-intervention measurements between experimental and control groups ($p < .001$); ^{f, g, h, i, j} Significant differences on post-intervention measurements between experimental and control groups ($p < .001$); ^{k, l, m} Significant differences between pre and post-intervention measurements at the experimental group ($p < .01$).

Discussion

This study aimed to assess the efficacy of a web-based school health education program based on the Theory of Planned Behavior (TPB) model and incorporating life skills training. We anticipated that the knowledge, the attitudes, subjective norms, and perceived behavioral control (PBC) of adolescents in relation to their alcohol behavior, can be affected through an intervention program. To assess the effectiveness of the program “ALCOSPO”, we carried out a randomized experimental study, involving two groups, the experimental and the control group. As anticipated, the students who received the intervention, report a significant influence of the program on their knowledge related to alcohol, on their PBC, on their alcohol behavior, and on their attitudes toward the program’s implementation. On the contrary, the control group did not exhibit any significant differences between the measurements pre- and post-intervention.

More specifically, the observed enhancement of knowledge within the context of alcohol, or substance use aligns with prior health educational programs conducted in school settings (Alcolado & Alcolado, 2011; Angeli et al., 2022; Kolovelonis et al., 2016; Nicholls et al., 2020; Vogl et al., 2009). Our findings underscore the importance of prioritizing the transfer of learning approach, specifically through life skills teaching (Botvin & Griffin, 2015), within the field of school health promotion (Velasco et al., 2021). This approach allows students to not only acquire knowledge, develop attitudes, and acquire skills in a targeted health promotion

context but also equips them with the ability to apply this knowledge, attitudes, and skills across diverse contexts or domains (Peters et al., 2013; Young et al., 2013).

Regarding the constructs of TPB, results indicated an increase in students' PBC. Results are in line with previous studies (Delpia et al., 2016; Kim et al., 2023). Numerous prior studies have consistently highlighted the significant influence of PBC on adolescents' intentions to consume alcohol (Cooke et al., 2016; Lawental et al., 2018; Marcoux & Shope, 1997; Watakakosol et al., 2021). Subsequently, PBC and intentions to consume alcohol have been found to predict the frequency of alcohol consumption and the onset of drinking (Kyrrestad et al., 2020; Watakakosol et al., 2021). Since individuals' perception of minimal obstacles positively correlates with heightened levels of perceived behavioral control and strengthened behavioral intentions (Ajzen & Madden, 1986), the observed decrease in alcohol-related behavior following the intervention, in the experimental group, may be attributed to the efficacy of the intervention in fostering lower levels of alcohol consumption and the observed increase in PBC. In line with previous findings, PBC exerts a significant influence on moderate levels of alcohol consumption (frequency of alcohol use), whereas intentions appear to exert a substantial influence on excessive patterns of alcohol consumption (Cutrín et al., 2020). Among interventions for alcohol use, school-based alcohol prevention interventions including personalized feedback, moderation strategies, expectancy challenge, identification of risky situations, and goal setting, have been associated with reduced frequency of drinking (Das et al., 2016). Thus, the literature suggests interventions to prioritize the coping function associated with alcohol consumption, thereby assisting individuals in cultivating alternative coping strategies to effectively address negative moods arising from unsatisfactory life circumstances (Tartaglia & Bergagna, 2020).

With respect to the remaining constructs of the TPB, specifically subjective norms, attitudes, and intentions toward alcohol consumption, no statistically significant differences

were observed between the two groups following the intervention. Previous research (Cooke et al., 2016) has established a robust association between attitudes and intentions regarding alcohol consumption. However, Kyrrstad et al. (2020) identified a mediating effect specifically among adolescents who have never initiated alcohol consumption, indicating that assessing one's own attitudes towards alcohol may pose challenges for adolescents who lack any prior experience with alcohol consumption. The non-significant effect of the intervention on attitudes may be partially attributed to the inclusion of a sample consisting of adolescents regardless of their risk of alcohol use, attitudes related to alcohol may not be fully developed during early stages of youth (Marcoux and Shope (1997). Concerning the subjective norms, this outcome could potentially be ascribed to inadequate design of the program to affect these constructs. According to Taylor (2018), subjective norms pertain to the individual's perceptions regarding specific benchmarks that adolescents are expected to meet to adhere to their social environment's normative expectations. These norms reflect the beliefs of others concerning the actions adolescents ought to undertake. May the intervention failed to produce a significant effect because the relationship between subjective norms and intentions is more robust compared to the associations between attitudes and intentions, as well as perceived behavioral control and intentions. Given the significant influence of subjective norms, it is plausible that the inability to modify these norms may have contributed to the lack of noteworthy alterations in intentions (Davey et al., 2014). It is crucial to acknowledge that the subjective norms of adolescents are influenced by both their peers and parents. Specifically, peers exhibiting protective behaviors exert a beneficial influence and the communication dynamics between adolescents and their parents have a more profound impact on their health and overall well-being (Tomé et al., 2012). Nevertheless, the influence of subjective norms on adolescents' health behavior remains somewhat ambiguous. While the TPB posits that subjective norms play a role in explaining behavioral intentions, it is worth noting that the social pressure

inherent in this construct may potentially hinder rather than promote the actual performance of the behavior (Biddle et al., 1980; Sicilia et al., 2015). The inclusion of parents in future interventions is highly suggested, as it has been shown to yield favorable outcomes, aligning with the observed enhancements in parent-adolescent relationships (Onrust et al., 2016).

Results obtained substantial improvements in adolescents' alcohol behavior. Specifically, students in the intervention group exhibited decreased scores in alcohol behavior during the post-intervention assessment when compared to their pre-intervention measurements. This result is in line with previous findings (Koning et al., 2009) and even with long-term effects (Toumbourou et al., 2013). The discerned potential for long-term effects in behavior-oriented treatments can be ascribed to interventions that specifically target the modification of individual behaviors (Tripodi et al., 2010). The implementation of a self-report measure for assessing alcohol consumption may have introduced biases related to self-presentation tendencies associated with recall accuracy (Davis et al., 2010). However, Del Boca and Noll (2000), reported that self-report questionnaires may furnish reliable estimates of alcohol consumption, revealing that the use of a one-month time frame was deemed favorable due to its ability to account for possible variations or deviations in weekly drinking patterns. Students exhibited positive attitudes towards the educational program. Notably, their feedback indicated high levels of satisfaction derived from their active engagement in the ALCOSPO program. Consistent with prior research (Angeli et al., 2022; Kim et al., 2023), the present findings align with the notion that adolescents positively embrace web-based interventions or educational programs implemented within school settings that incorporate interactive novel technological approaches (Champion et al., 2013). Finally, it is important to note that during middle adolescence, the effectiveness of universal programs tends to be limited, coinciding with the emergence of heightened opportunities for substance use prevention (Onrust et al., 2016).

Taking the above into consideration, the findings of this study, provide evidence regarding the effectiveness of school-based behavior change programs in reducing students' alcohol consumption as the primary outcome variable, while also yielding improvements in certain behavior patterns. However, it is imperative to interpret the results of this study with caution due to some inherent limitations. Firstly, the utilization of self-reported questionnaires may introduce response biases, potentially influencing the accuracy and reliability of the collected data. Additionally, an important factor to consider is that the teachers responsible for implementing the program sessions did not receive any specific training, thereby giving rise to concerns regarding implementation fidelity (Li et al., 2021). The active involvement of teachers significantly influences students' behavioral responses, encompassing motivational factors and engagement levels with the program's material (Valero Valenzuela et al., 2019). These fidelity issues may, in part, contribute to the inconclusive nature of some findings. It is crucial to acknowledge that the implementation of the current program and the subsequent evaluation results have the potential to contribute to the personal and professional growth of the participating teachers, as well as prospective educators.

Conclusions

In conclusion, the educational program demonstrated improvements in students' knowledge, perceived behavioral control (PBC), and alcohol behavior. Significantly, the evaluation underscored the high levels of satisfaction expressed by the students regarding the program. Despite the limitations, the implications of these findings hold valuable relevance for interventions aimed at preventing alcohol consumption among Greek high school students.

Conflicts of Interest

The authors declare no conflict of interest.

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Chapter 5

Study 4

A pilot study to evaluate the impact of a Greek TPB educational program to prevent bullying among early adolescents.

Abstract

Our research aimed to assess the effectiveness of a health education program in preventing bullying among elementary school students in Greece. The program was designed based on the Theory of Planned Behavior and included life skills instruction. 203 students (with an average age of 11.37 years) were enrolled and randomly assigned to either the experimental or control group. The experimental group participated in eight one-hour sessions over an eight-week period. Our findings revealed that the experimental group had significantly greater knowledge about bullying than the control group. However, there were no notable differences in TPB variables between the two groups before and after the program. The students who participated in the program expressed high levels of satisfaction. Our study highlights the significance of the aforementioned factors for future research endeavors aimed at preventing bullying among elementary school students in Greece.

Keywords: Students, bullying, aggressive behavior, school-based intervention, adolescents

INTRODUCTION

Behavioral and mental challenges tend to occur in childhood and may endure into adulthood, according to studies (Korhonen et al., 2014; Vergunst et al., 2019). Aggression manifests itself in both overt and covert ways and is defined by anger mixed with aggressive acts that may cause harm to others (de Almeida et al., 2015; Jones et al., 2011). The most prevalent types of aggressive conduct in children and adolescents are overt and covert aggression (Fauzi et al., 2023). Olweus (1994) defines “bullying” as “a repeated and intentional form of aggressive behavior directed at individuals with limited ability to defend themselves”. Bullying is a sort of aggressive conduct that can manifest itself in a variety of ways, such as verbal, physical, interpersonal, and cyberbullying. Adolescence is a developmental stage in which peer interactions become increasingly important, including the desire for a sense of social belonging and popularity within the peer community (de Bruine et al., 2022; LaFontana & Cillessen, 2010). Adolescents who participate in acts of aggression may gain popularity, but victims often experience extended victimization and are far less inclined to share their incidents with adults (Blomqvist et al., 2020; Brendgen & Poulin, 2018; Troop Gordon, 2017). Aggression among adolescents is linked to involvement in criminal activity later during adulthood (Ttofi et al., 2012; Ttofi et al., 2011), and other risky behaviors, posing a significant public health concern due to its potential association with injuries, personal trauma, suicidal tendencies, and academic performance (Srabstein et al., 2006; WHO, 2017; Wolke et al., 2013; Zaborskis et al., 2019). Negative emotional experiences such as anger, anxiety, guilt, shame, and depression are also commonly associated with bullying (Muratori et al., 2017; Viottini et al., 2020). It is crucial to understand the causative factors behind these behaviors to develop effective intervention initiatives (Kljakovic & Hunt, 2016), given the adverse consequences associated with bullying and victimization.

The outcomes primarily center on factors of significance, such as gender, where there exists a discernible tendency for boys to exhibit a notably higher propensity for engaging in bullying behavior as compared to their female counterparts (Alvarez-Garcia et al., 2015; Cook et al., 2010; Mitsopoulou & Giovazolias, 2015) and age, as the likelihood of a student assuming the role of a bully demonstrates an ascending trend from the initial phases of adolescence and exhibits a subsequent decline during late adolescence (Álvarez-García et al., 2015; Cook et al., 2010). Moreover, personality traits and psychosocial variables such as diminished levels of conscientiousness and empathy, diminished self-esteem, and deficits in social skills, have been identified as crucial determinants in elucidating various types of aggressive behaviors (Fisher et al., 2016; Lovett & Sheffield, 2007; Mitsopoulou & Giovazolias, 2015; Zych et al., 2017). Conversely, the fostering of social competencies, enhanced resilience, a more positive self-perception, and improved psychological well-being in conjunction with the maintenance of a consistently positive school environment, are recognized as crucial protective determinants against the occurrence of bullying (Papamichalaki, 2021; Saiz et al., 2019). All the previously mentioned facets collectively suggest the intricate nature of bullying behavior, and that constitutes a complex, dynamic, psychosocial phenomenon (Evans et al. 2014; Kumpulainen, 2008; Rettew & Pawlowski, 2016; Ryan & Hurst, 2021; Zych et al., 2017).

Health promotion, defined as, assisting individuals in enhancing their control over well-being (WHO, 2009), provides the necessary resources for developing and applying efficacious interventions to prevent bullying incidents (Hodgins, 2008). Education stands as a foundational component within the construct of a proficient health behavior intervention, and it facilitates the achievement of intervention objectives (Arlinghaus & Johnston, 2018; Avery et al., 2013). In light of that, school emerges as a crucial context that significantly influences the broader society and culture of youths and considering that nearly all young individuals participate in educational institutions, the school environment presents an ideal setting for examining,

preventing, and evaluating bullying, and other forms of unhealthy behaviors (Hall, 2017; Majcherová et al., 2014; Merrell et al., 2008; Pulimeno et al., 2020). Undoubtedly, showcasing a pronounced and intimate connection between education and health (Suhrccke & de Paz Nieves, 2011). Thus, the literature suggests the development of an all-encompassing and universally applicable policy targeting eradicating bullying across the entire school environment (Farrington & Ttofi, 2009; Ttofi et al., 2011).

Over time, comprehensive analyses of prior interventions aimed at combating bullying behavior have indicated that the aggregate outcomes of anti-bullying initiatives have, on average, demonstrated outcomes ranging from moderate, to null or substantial effectiveness (Castillo-Eito et al., 2020; Merrell et al., 2008; Ng et al., 2022; Smith et al., 2011; Ttofi et al., 2012). This suggests a lack of definitive conclusions regarding the overall efficacy of these initiatives. More specifically, meta-analytical investigations have predominantly centered on which elements amplify or reduce the effectiveness of interventions. Engagement in physical activity (Spruit et al., 2016), initiatives promoting favorable youth development (Melendez-Torres et al., 2016), behavioral training, behavioral modeling, or the establishment of behavioral contracts (De Vries et al., 2015), instruction in social skills (Fossum et al., 2008; Mytton et al., 2006; Silva et al., 2018), approaches on enhancing resilience (Hansson et al., 2020; Hinduja, & Patchin, 2017), represent some significant moderators of effectiveness. A growing body of research advocates that physical well-being can be regarded as a predictor to consider in the context of bullying. To be more precise, maintaining good cardiorespiratory fitness, which offers numerous physical and mental advantages, could potentially serve as a protective factor against engagement in bullying behavior (Benítez-Sillero et al., 2021; Langford et al., 2014; Majed et al., 2022; Ouyang & Liu, 2023).

Moreover, empathy towards victims of cyberbullying has been found to have a positive correlation with bystanders' inclination to assist victims (Bastiaensens et al., 2014; Erreygers

et al., 2016). Thus, Brendgen and Poulin (2018), advocate for the development of social skills, citing their demonstrated effectiveness in fostering the creation of supportive friendships, which in turn act as a proactive strategy against the onset of interpersonal stressors and alleviation of symptoms associated with depression. According to research, children who acquired the capability to regulate their emotions displayed improved behavioral conduct, effective social adaptation, heightened empathy towards others, and reduced stress levels. (Gross, 2015; Thompson & Meyer, 2007).

Considering that bullying is a cognitive behavioral phenomenon (Doll et al., 2012), influenced by multiple factors at the individual, interpersonal, societal, cultural, and environmental levels (WHO, 2020), the development of a theory-based cognitive-behavioral intervention in the school setting, could potentially serve as an ideal strategy to prevent bullying incidents.

Theory of Planned Behavior and bullying

According to research, a theoretical framework serves as a comprehensive and overarching structure that can be employed to enhance comprehension of bullying phenomena and to guide the development of efficacious strategies and initiatives for both prevention and intervention (Mishna, 2012). Ajzen (1991, 2002) introduced the Theory of Planned Behavior (TPB) as a framework for elucidating volitional actions within the context of social psychology. TPB is classified as a cognitive theory, that offers a conceptual framework that facilitates the projection of individuals' behavioral intentions and consequently enables the anticipation of their probability to undertake said behavior (Ajzen, 2020). According to TPB, attitudes, are the individual's overall behavioral beliefs, subjective norms, which encompass an individual's perceptions regarding whether important individuals in their social circle endorse their involvement in the behavior, and perceived behavioral control, which refers to individuals'

perceptions regarding their capacity to execute specific actions. Collectively, these factors serve as predictors of whether the individual intends to engage in the behavior or abstain from it. (Fishbein & Ajzen, 2011), and “intention” is commonly employed as a predictive factor for the actual behavior (Morwitz, & Munz, 2021).

In the context of bullying, attitudes represent the stance held by individuals who consider aggressive behaviors permissible. Consequently, there is an increased propensity for these individuals to engage in bullying (Pabian, 2014). More specifically, students with high attitudes toward aggression exhibited a propensity for positively assessing their inclination to engage in aggressive behavior, regardless of the consequences for both themselves and others (Duru, 2015; Fauzi et al., 2023). Elevated attitude scores toward Similarly, regarding the subjective norm factor, when individuals are convicted that their behavior is accepted by peers, family members, and other relevant parties might also hold a crucial significance for individuals (Raskauskas, 2007). Perceived behavioral control involves individuals' convictions regarding their capacity to participate in bullying behaviors. When individuals possess the capability to establish anonymous online connections, they are more inclined to exhibit bullying on the internet that they might not readily demonstrate in face-to-face interactions. This inclination arises from diminished self-awareness and decreased inhibitions among individuals (Kowalski et al., 2014). Prevention of unhealthy behaviors holds significant importance during early adolescence, as this developmental phase plays a crucial role in the establishment of behavioral standards (Bay et al., 2019; Meiksin et al., 2019).

Thus, recent research has utilized the TPB framework to prevent bullying, cyberbullying, and aggressive behaviors in school settings (e. g. Aizenkot, & Kashy-Rosenbaum, 2020; Doane et al., 2016; Kaveh et al., 2022; Khaleghi et al., 2023; Wölfer et al, 2014). For example, Khaleghi et al. (2023), implemented a school educational intervention, of eight training sessions, each encompassing a duration of 55 to 60 minutes, grounded in the TPB, on

aggression-preventive behaviors exhibited by male fifth-grade students. After a three-month interval subsequent to the intervention, the experimental group demonstrated a noteworthy influence on attitude, subjective norms, perceived behavioral control, and intention to participate in aggressive behaviors. The authors propose that the TPB had a significant effect on the attitudes and aggressive behavior of male elementary school students. Similarly, Kaveh et al., 2022, implemented and evaluated an educational intervention program consisting of 5, 1-hour sessions, among male middle school students. Post-intervention results indicated a significant effect on all constructs of TPB except for subjective norms, between the two groups. Furthermore, the mean scores of physical aggressions within the experimental group exhibited statistically significant differences. In the context of cyberbullying, Aizenkot and Kashy-Rosenbaum (2020), assessed the efficacy of a web-based cyberbullying intervention. A total of 1.550 students enrolled across primary, middle, and high school levels participated in the study. The results demonstrated a substantial decrease in both online and offline bullying subsequent to the intervention. Additionally, there was an increase in self-esteem and an enhancement in perceived popularity among the primary school participants.

The existing body of research indicates that incorporating the expanded TPB framework when studying aggression has been mentioned in previous studies (Alimoradi et al., 2022; Hanurawan et al., 2021). However, it's worth emphasizing that there is limited empirical evidence within the current literature supporting the applicability of TPB for investigating bullying behaviors (Kaveh et al., 2022). To fulfill our research goals, we chose to develop, implement, and assess an educational program within the school context. This program's primary objective was to prevent bullying among elementary school students.

Life skills teaching and bullying behavior.

In academic literature, the importance of integrating the socio-cognitive development of adolescents into strategies aimed at preventing bullying has been empirically supported (Jessor,

1991; Potard et al., 2021). This integration is underpinned by the belief that adolescents have the capability to effectively navigate life's obstacles through the application of acquired life skills (Potard et al., 2021). Life skills, encompass essential competencies that enhance psychological well-being and promote positive social interactions (Goudas, 2000). On the whole, life skills are classified into 3 categories: (i) decision-making skills, (ii) interpersonal and communication skills, and (iii) self-management skills (WHO, 2003). A significant proportion of adolescents who lack essential life skills, such as anger management, stress coping techniques, self-awareness, problem-solving, and decision-making skills, are prone to displaying heightened anger, resentment, and aggression in response to failures, in contrast to their peers (Pepler et al., 1995; Middleton & Cartledge, 1995). Moreover, a growing body of literature, suggests that Stress exhibits a significant positive predictive impact on school bullying behavior, indicating that when individuals' stress level increases, so does their susceptibility to engage in school bullying behavior (Luo et al., 2023; Mei et al., 2021; Xu et al., 2018; Wang & Zhang, 2015).

In consideration of the aforementioned findings, life skills teaching is a viable approach to preventing aggressive behavior in youth (Kartal & Cavusoglu, 2022). For example, competencies in interpersonal communication encompass facets of social cognition, such as the capability for empathy (Frith & Frith, 2008). Recent research has established a correlation between victimization and decreased empathy among adolescents (Jenkins et al., 2017; Martínez et al., 2020). Concerning the role of bystanders, active defense is positively associated with heightened empathy, while followers and outsiders typically exhibit diminished empathy (Haddock & Jimerson, 2017; Yang & Kim, 2017). Moreover, Parris et al. (2019) identified a substantial correlation between engaging in bullying behavior and the ability to regulate negative emotions. Additionally, during the early phase of adolescence, there's a time of emotional and cognitive growth, with an elevated sensitivity to rewards and rejections

(Immordino-Yang et al., 2019). Consequently, teaching self-regulation and decision-making abilities, through life skills education, attains significance (Kirchhoff & Keller, 2021). In their recent comprehensive review, Potard et al. (2021) underscored the significance of both interpersonal skills, encompassing empathy and moral disengagement, as well as stress management skills, including coping strategies. The study revealed a consensus regarding the impact of these skills on the manifestation of bullying behavior among adolescents.

In view of these findings, Botvin et al. (2006), conducted a school-based intervention with the objective of reducing aggressive behaviors among a cohort of 4,858 adolescents. The intervention consisted of a structured program comprising 15 sessions based on life skills education, featuring cognitive-behavioral strategies encompassing problem-solving, decision-making, and stress and anxiety management. The outcomes of the study demonstrated a noteworthy decline in instances of physical and verbal aggression, as well as delinquent behaviors. A recent study of Bandak et al., (2020), examined the effect of life skills education on bullying prevention among adolescents. The study's findings demonstrated that life skills education significantly contributed to improved social adjustment and a reduction in students' bullying behavior, suggesting the implementation of a comprehensive life skills training program as a component of school-based interventions engaged in bullying and aggressive behaviors. Mandigo et al. (2016), their study investigated the association between aggressive behaviors and the fostering of life skills in Salvadoran school children. Moreover, they explored the prospective contribution of physical education in curbing youth violence, showing promising findings the potential of school-based physical education to facilitate positive behaviors in relation to life skills and aggressive behaviors, notably among male individuals.

Contemporary research underscores the significance of positive behavioral interventions that incorporate educational methodologies (Beyl, 2020; Charlton et al., 2021; Nitz et al., 2023). This involves enhancing individual awareness of the underlying rationales for behavior

modification, coupled with providing essential step-by-step guidance through life skills education (Arlinghaus & Johnston, 2018). These approaches hold the potential to effectively address aggressive behaviors (Glick & Gibbs, 2011). Moreover, students are poised to acquire and adeptly apply knowledge, attitudes, and skills necessary for comprehending and managing emotions, achieving positive objectives, demonstrating empathy, and making responsible decisions (Durlak et al., 2011). Considering the information presented above, the incorporation of life skills education could potentially serve as an effective element within an efficacious intervention strategy aimed at promoting the prevention of bullying behaviors.

Behavior Change Techniques and bullying behavior

Promoting positive behavioral changes among adolescents is crucial, in order to reshape the discussion surrounding bullying through educational and societal initiatives (Swearer et al., 2017). Behavior change interventions generally involve a range of strategies and methods to effectively alter or promote the intended behavior (Craig et al. 2008). A Behavior Change Technique (BCT) can be defined as a “*systematic procedure included as an active component of an intervention designed to change behavior*” (Michie et al., 2015, p. 190). Universal psychosocial therapies with proven efficacy in reducing aggressiveness, including integrated components such as behavioral practice (e.g., BCT) and problem-solving skills (Castillo-Eito, 2020). According to a recent meta-analysis published by Castillo-Eito (2020), the most frequently used BCTs in interventions targeting the reduction of aggression included techniques such as: behavioral practice, problem-solving, instructions on behavior execution, and providing information about social and emotional consequences. Among these BCTs, the problem-solving technique demonstrated the most promising outcomes. In consideration of the above, this study is designed to explore the effect of a theory-driven behavioral education intervention, on bullying prevention among early adolescents attending Greek elementary

schools. This program is grounded in the TPB, enhanced by the integration of life skills education.

Aim of the study

The purpose of this study was to assess the efficacy of the H.E.R.O. intervention, a preventative educational program implemented in schools. This program was designed based on the theoretical framework of the TPB and further enriched by the addition of life skills education. It is hypothesized that, the experimental group will demonstrate significant improvements in knowledge regarding bullying behavior, improvements in their attitudes, subjective norms, perceived behavioral control, control over aggressive behavior, when compared to the control group. Furthermore, students in the experimental group are expected to improve their attitudes toward the program's implementation and a high satisfaction with the program.

Description of the Program

The “*Be a H.E.R.O.*” program, which acronym refers to Help Educate Report Overcome, is a school-based health education initiative designed to prevent bullying behavior among adolescents. Rooted in theoretical principles, it incorporates various BCTs to achieve its primary objective. Specifically, the program endeavors to reshape students' attitudes and behavior variables related to bullying and aggression. It accomplishes this by promoting physical activity, teaching self-regulation strategies, and imparting life skills. Additionally, the program seeks to empower students to address challenges, set and pursue goals, share knowledge with peers and important individuals in their lives, cultivate positive thinking, and enhance self-esteem. It also encourages students to provide support to those facing bullying and comprehend the underlying factors contributing to bullying incidents. All of these components are delivered to students through a variety of approaches, including kinetic games, trivia, self-assessment quizzes, dramatic scenarios, discussions, group activities, and video

presentations. Group discussions, modeling, behavior rehearsal, feedback, reinforcement, and assignments for practice outside of the classroom are all part of the knowledge transfer process. The program spans over a duration of 8 weeks, with each week featuring a one-hour session.

Method

Participants

Two-hundred and three ($N = 203$) students, from seven elementary schools in central Greece, were willingly involved in a school-based anti-bullying educational program. Seventy-eight ($N = 78$) of them were boys, while 125 were girls, aged 10 to 13 years old ($M_{age}: 11.37 \pm .72$ years). Four out of the seven schools ($N = 108$ students) were randomly assigned as experimental group, while the remaining three ($N = 95$ students) were randomly assigned as control group. Experimental school students attended eight one-hour class sessions related to bullying prevention. The duration of the intervention program was approximately eight weeks (one lesson per week from February 2023 to April 2023). The control group students continued their typical schedule under the supervision of their teacher. It is important to mention here that, after the end of the anti-bullying educational program, the trained researcher also delivered the eight lessons to the students in the control group in a shorter period of time (two lessons per week).

Instruments

The questionnaires were developed based on previous studies conducted in the Greek language, which examined the effectiveness of interventions conducted within educational contexts (Angeli et al., 2022; Hassandra et al., 2009). The TPB scales, following Ajzen's (2002) guidelines, were developed to evaluate students' attitudes and intentions related to aggressive behavior, subjective norms, PBC, and attitudes toward the program. Students were informed that their answers should be relevant to the last two months. The term “*aggressive behavior*”

was defined to include actions such as shouting, kicking, swearing, screaming, threatening, pushing, damaging objects, using sarcastic language, and rejecting someone.

Attitudes towards aggressive behavior

Five items were utilized to evaluate attitudes towards aggressive behavior (e.g., *For me having an aggressive behavior is...*). Students were instructed to record their responses using a 7-point bipolar Likert scale, encompassing dimensions such as good-bad, healthy-unhealthy, useful-useless, and pleasant-unpleasant.

Intention to control my aggressive behavior

The assessment of intention regarding aggressive behavior involved the incorporation of two items. (e.g., *"I plan to control my aggressive behavior"*, *"I will try to control my aggressive behavior"*). Students expressed their responses using a 7-point Likert scale, ranging from 1 (representing strong disagreement) to 7 (representing strong agreement).

Subjective norm

Subjective norm evaluation involved the utilization of two specific items. (*"People important in my life would like me to pay attention to how I treat others"*, *"Great people in my life would like me to pay attention to how I treat others"*). Students' responses ranged on a 7-point Likert scale, with 1 indicating strong disagreement and 7 indicating strong agreement.

Perceived behavioral control (PBC)

To evaluate students' perceived control over their bullying behavior, two items were employed. (*"I can control my aggressive behavior"*, *"It is my responsibility to control my aggressive behavior"*). Their responses were measured on a 7-point Likert scale, ranging from 1 (strongly agree) to 7 (strongly disagree).

Attitudes towards the program's implementation

Pre-intervention instrument, within the context of the prompt *"For me, this program on bullying, will be"* (pre-intervention measure), *"For me, this program on bullying is:"* (post-

intervention measure). Participants were instructed to use a 7-point Likert scale, which featured bipolar word pairs (e.g., *good-bad*, *pleasant-unpleasant*, *attractive-unattractive*, and *useful-useless*), to convey their responses.

Satisfaction with the program

We assessed the program's satisfaction among the experimental group after the intervention concluded by employing a questionnaire comprising five items. (e.g., *“This programme was easy”*, *“I prefer to learn about such topics through a program rather than a book”*, *“I am satisfied with the texts of this programme”*, *“I am satisfied with the design of this program”*, *“I am satisfied with the images I saw in this programme”*). Students provided their responses utilizing a 7-point Likert scale, with options ranging from 1 (representing strong disagreement) to 7 (indicating strong agreement).

Knowledge about bullying

A questionnaire consisting of 18 items was developed to measure students' knowledge. The questionnaire is constructed using insights gained from previous evaluations of school-based health intervention programs (e.g., Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016). The included questions were closely aligned with the program's subject matter, specifically targeting the covered topics. These questions were strategically crafted to assess students' grasp of the content and their ability to retain the material. (e.g., *“Bullying is a type of aggressive behavior that is repeated over and over again”*, *“Bullying is an emotion, not a behavior”*, *“The upstander resists the person who bullies”*, *“To support someone who is being abused, I inform an adult”*, *“Physical activity is not associated with stress relief”*, *“Emotional intelligence is the ability to recognize the feelings of others”*, *“Positive self-talk helps to increase my self-confidence”*, *“Positive thinking can benefit people who are being bullied”*, *“Children who demonstrate difficulties in solving problems are more at risk of being bullied and becoming targets of bullying themselves”*, *“Cyberbullying is a form*

of aggressive behavior with far fewer consequences than physical bullying”, “Indirect help and support to someone who is being bullied is not as effective as confrontation”, “The roles of the Upstander and the Observer are similar”, “Violence in sports is mainly expressed in sports venues because they are impersonal, thus favoring such events”, “Insult is not a form of bullying”, “To deal with a possible anger outburst, it would be advisable to apply a self-regulation strategy, such as breathing technique or self-talk”, “Nicknames and name-calling are not a form of bullying”, “Individuals who bully may have low self-esteem and other behavioral problems”, “Lack of education from family and school leads to inappropriate behaviors”). For knowledge-related items, we applied a scoring system wherein accurate responses were allotted a score of 2, incorrect responses received a score of 0, and responses indicating uncertainty, marked as *“I am not sure”*, were assigned a score of 1. Participants' total scores fell within the spectrum of 0 to 54. It is crucial to note that the selection of “yes” did not necessarily signify the correct response.

Procedure

This study received ethical approval from the Bioethics Committee of the Department of Physical Education and Sport Science, University of Thessaly, Greece (Ref. Number: 2011; Date: 7 December 2022). Furthermore, the program received approval from the Directorate of Primary Education, confirming its validity and appropriateness. The program was communicated to elementary schools in Central Greece via email correspondence. School principals indicated their willingness to engage in the research project, seven elementary schools participated, at the outset of the intervention, both students and their respective parents/guardians provided informed consent to participate in the study, and completed the preintervention questionnaires and their students were randomly assigned into two groups, control and experimental group. The experimental group participated in a series of eight one-hour program sessions. Conversely, the control group initially filled out pre-intervention

questionnaires. Following an 8-week waiting period, they then completed post-intervention questionnaires. Throughout this waiting interval, the control group did not receive the program or any equivalent intervention. The intervention sessions were administered by a researcher who was familiar with the study's protocols. Comprehensive descriptions of the program's sessions and activities are provided in Table 1.

Table 1. Description of the “*Be a H.E.R.O.*” program.

Sessions	Theoretical Construct	BCT	Contents	Activities
1st	Attitudes Knowledge Life Skills	Shaping knowledge Forming behavioral beliefs Behavioral contract	General knowledge about aggressive behavior— Identify bullying – “Which are the forms of bullying” – Facts about bullying – Introduction to goal-setting technique	Quiz: “Did you know that...?” – “Above the line- Below the line” - Video-based group discussion – “Goal plan: Setting goals before implementing the program”
2nd	Attitude Knowledge Education	Shaping knowledge Verbal persuasion about capability Beliefs about consequences	Introduction, explanation, and characteristics of each role in bullying incidents – Benefits of understanding roles – Consider the impact of words before speaking - Resonate with the severity of bullying's impact and	“Which roles are involved in a school bullying incident” – Worksheet: “Characteristics of a bully – Characteristics of a victim?” – “T.H.I.N.K. Before You Speak” – Table:

			strengthen the persuasive messages	“Bullying consequences in rates: Did you know...”
3rd	Subjective norm Perceived behavioral control Intention Life skills	Monitoring of behavior Action planning pros and cons Feedback Commitment	Introducing the upstander and the observer – Characteristics of upstander – Roleplaying and reflection- Bring attention to the inappropriate behavior and encourage a supportive behavior	“What it's like to put yourself in someone else's shoes: Emotional intelligence” – Worksheet: “Upstander Vs Observer” – Role play: How to be an upstander! – “From observer... Upstander! What phrases would you use to support a classmate who is being bullied?”- Pantomime Game: The Jar of Feelings – Goal planner: “I will commit trying to....”
4th	Knowledge Life Skills Attitude Subjective norm	Provide information. Social proof	Recognize the psychological and physical consequences of bullying – Identify cyberbullying –	Facts: Those who engage in bullying behavior may..., Those who experience

	Perceived behavioral control	Self-belief (verbal persuasion about capability)	prompt positive self-talk - Supportive Prompts – Foster resilience.- Practice self-talk	bullying behavior may...” - Discussion: “What are the similarities and differences?”- Knowledge quiz on cyberbullying awareness – Video-based group discussion: Why do people bully? We’ll show you! - Vicious Circle: Understanding the Role of Self-Esteem – Positive Self talk journal
5th	Attitude Life skills Perceived behavioral control	Information about health consequences Prompts/ cues	Introduce physical activity as an alternative to aggressive behavior – Reduce negative emotions	Knowledge test: “The benefits of exercise for our psychology.” – Exercise Habits Quiz – “The Positive Diary” – Table: “I will commit trying to...” (Exercise behavior)
6th	Perceived behavioral control. Attitudes	Information about health consequences	Introduce self-regulation techniques – Stress	Discussion: “What are the symptoms of anxiety?” – Practice

	Life Skills Knowledge	Natural consequences Self-Reflection and Self-Improvement	management - Problem-solving strategy	breathing technique in class – Brainstorming: “How do you manage negative emotions such as anxiety and anger?” – “Anger management worksheet”
7th	Perceived behavioral control Life skills	Decisional balance Self-belief (verbal persuasion about capability) Action planning	Benefits of positive thinking for bullying victims – How should I treat others based on Aristotle’s “Golden Mean”	Classify: “What I can and I can’t control” - Steps to turn the negative thought into positive – Video- based group discussion: "Golden Mean" of Aristotle
8th	Knowledge Life skills Perceived behavioral control	Provide information Action planning Ethical decision-making	Introduce problem-solving technique - “Think-Evaluate – Conclude” technique	Research results: “Problem-solving helps in preventing bullying behavior” - "The 10 Steps to Resolve a Conflict." – Work team: “Find the solution to the problem” – Problem solving worksheet - Homework

Statistical analysis

An a priori power analysis with the G*Power program version 3.1 (Faul et al., 2007) was first carried out to determine whether the study's sample size was suitable. A sample size of 64 to 138 participants was proposed for a 2x2 analysis of variance (ANOVA) with repeated measures. This sample size proposal was established on an expected small effect size of -.18 or -.12, derived from a meta-analysis of school bullying intervention programs targeting to reduce attitudes favouring bullying or school violence and its frequency, respectively (Jiménez-Barbero et al., 2016), a statistical power of .80, and a p value of less than .05. Based on the above, the sample size of the present study was 203 students for both measurements, which was higher than the acceptable level of statistical power required.

IBM SPSS version 26.0 (IBM Corp, Armonk, NY, USA) was used for all the statistical analyses. The significance threshold was established at $p \leq .05$. Cronbach's alpha reliability index and descriptive statistics (means, standard deviations) for both measurements were calculated. Then, separate 2x2 analysis of covariance (ANCOVA) with repeated measures were calculated to check for possible differences in the examined variables (attitudes towards aggressive behavior, intention to control aggressive behavior, subjective norms against involvement in aggressive behavior, perceived behavioral control against involvement in aggressive behavior, satisfaction with the program's implementation, knowledge about bullying, controlling aggressive behavior), between time (pre-post), group (experiment and control) and interaction between time and groups, after controlling for gender and age effect, simultaneously. Sidak post-hoc test was used to adjust for multiple comparisons within and between groups. Finally, a paired samples t -test was used to examine possible differences on attitudes towards anti-bullying program implementation between pre and post-intervention measurements only for the students in the experimental group.

RESULTS

Descriptive statistics (means, standards deviations) and reliability index between pre and post intervention measures on school-based anti-bullying educational program are presented in Table 2. The reliability index was ranged from .52 to .93 at the pre-intervention measurements and from .57 to .93 at the post-intervention measurements, respectively. It is important to mention here that the experimental group's students were very satisfied with the implementation of the anti-bullying educational program ($M = 6.15$, $SD = .98$).

Table 2. Descriptive statistics (means, standards deviations) and reliability index between pre and post intervention measures on school-based anti-bullying educational program.

Variables	Pre- intervention			Post- intervention		
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	<i>A</i>
Attitudes towards aggressive behavior	1.99	1.32	.88	1.86	1.28	.90
Intention to control aggressive behavior	6.06	1.41	.71	6.20	1.22	.73
Subjective norms against involvement in aggressive behavior	6.25	1.26	.83	6.45	.91	.77
PBC against involvement in aggressive behavior	6.20	1.03	.60	6.27	.931	.57
Attitudes toward the anti-bullying program's implementation*	5.81	1.51	.93	5.98	1.43	.93
Knowledge about bullying	26.20	4.10	.53	27.10	4.53	.60
Controlling aggressive behavior	5.44	1.08	.52	5.58	1.17	.69
Satisfaction of the program	-	-	-	6.15	.98	.76

*these values represent experimental group

A 2x2 ANCOVA with repeated measures showed no significant effect of time ($F_{1,189} = 2.720, p = .101$), group ($F_{1,189} = .009, p = .927$), and interaction between time x group ($F_{1,189} = 1.374, p = .243$) on the dependent variable attitudes towards aggressive behavior, after controlling for gender ($F_{1,189} = .014, p = .905$) and age ($F_{1,189} = 3.025, p = .084$).

Similarly, no significant differences emerged on the dependent variable intention to control aggressive behavior due to time ($F_{1,195} = .482, p = .489$), group ($F_{1,195} = .140, p = .708$) and interaction time x group ($F_{1,195} = .405, p = .525$), after controlling for gender ($F_{1,195} = .224, p = .637$) and age ($F_{1,195} = .279, p = .598$).

Furthermore, results revealed no significant effect of time ($F_{1,193} = 1.162, p = .282$), group ($F_{1,193} = .355, p = .552$), and interaction between time x group ($F_{1,193} = .206, p = .651$) on the dependent variable subjective norms against involvement in aggressive behavior, after controlling for gender ($F_{1,193} = .311, p = .578$) and age ($F_{1,193} = .695, p = .406$).

Regarding the dependent variable PBC against involvement in aggressive behavior, results showed no significant effect of time ($F_{1,197} = .027, p = .871$), group ($F_{1,197} = .005, p = .943$), and interaction between time x group ($F_{1,197} = .195, p = .659$), after controlling for gender ($F_{1,197} = .175, p = .676$) and age ($F_{1,197} = .000, p = .982$).

Regarding the dependent variable knowledge about bullying, there was no significant main effect of time ($F_{1,173} = 1.766, p = .186$), but there was a significant main effect of group ($F_{1,173} = 8.860, p < .01, \eta_p^2 = .05$) and a significant interaction between time x group ($F_{1,173} = 8.026, p < .01, \eta_p^2 = .04$), after controlling for gender ($F_{1,173} = .100, p = .752$) and age ($F_{1,173} = 2.412, p = .122$). Analyzing this interaction in terms of time, no significant differences found between pre-and post-intervention measurements in the control group

($F_{1,173} = .089, p = .766$). In contrast, there were significant differences in the experimental group between pre-and post-intervention measurements ($F_{1,173} = 14.551, p < .001, \eta_p^2 = .08$). More specifically, students in the experimental group had higher score in knowledge about bullying at the post-intervention measurement compared to the pre-intervention measurement (Table 3). Furthermore, analyzing this interaction in terms of group, no significant differences found between experimental and control group at the pre-intervention measurement ($F_{1,173} = .733, p = .393$). In contrast, there were significant differences between experimental and control group at the post-intervention measurement ($F_{1,173} = 15.431, p < .001, \eta_p^2 = .08$). More specifically, experimental group's students reported higher score in knowledge about bullying at the post-intervention measurement compared to the control group (Table 3).

Next, a 2x2 ANCOVA with repeated measures showed no significant effect of time ($F_{1,197} = .501, p = .480$), group ($F_{1,197} = .514, p = .474$), and interaction between time x group ($F_{1,197} = 1.127, p = .290$) on the dependent variable controlling aggressive behavior, after adjusted for gender ($F_{1,197} = 4.804, p < .05, \eta_p^2 = .02$) and age differences ($F_{1,197} = .133, p = .716$).

Results also revealed no significant effect of time ($F_{1,198} = .569, p = .452$), group ($F_{1,198} = 2.081, p = .151$), and interaction between time x group ($F_{1,198} = 2.380, p = .125$) on the dependent variable exercise behavior, after controlling for gender ($F_{1,198} = .114, p = .736$) and age ($F_{1,198} = .518, p = .473$).

Finally, a paired samples *t*-test revealed no significant differences on attitudes towards anti-bullying program implementation ($t_{98} = -.891, p = .375$) between pre ($M = 5.79, SD = 1.53$) and post-intervention measurements ($M = 5.96, SD = 1.44$) only for the students in the experimental group.

Table 3. Adjusted means, standard errors and significant differences between and within groups on the examined variables.

	Experimental Group				Control Group			
	Pre		Post		Pre		Post	
Variables	Madj	SE	Madj	SE	Madj	SE	Madj	SE
Attitudes towards aggressive behavior	2.00	.13	1.80	.12	1.93	.13	1.90	.13
Intention to control aggressive behavior	6.05	.14	6.26	.12	6.07	.15	6.13	.13
Subjective norms against involvement in aggressive behavior	6.30	.13	6.48	.09	6.18	.13	6.45	.09
PBC against involvement in aggressive behavior	6.21	.10	6.25	.09	6.18	.11	6.30	.10
Knowledge about bullying	26.43a	.42	28.32a,b	.45	25.91	.44	25.76b	.47
Controlling aggressive behavior	5.36	.11	5.57	.11	5.54	.11	5.59	.12

Madj: Adjusted Mean; SE: Standard Error; PBC: Perceived Behavioral Control; α : Cronbach's alpha reliability index.

a Significant difference between pre and post intervention measurements.

b Significant difference between experimental and control group at post intervention measurements.

Discussion

This study aimed to assess the effect of the “*Be a H.E.R.O.*” program, an education initiative grounded in theoretical principles, on adolescents. The central focus was to disseminate understanding of bullying behavior, provide students with strategies for managing aggressive behaviors, and enhance students' attitudes, subjective norms, and perceived behavioral control. The program's structure was rooted in the principles of the TPB, complemented by life skills instruction and it was executed within Greek educational institutions. The outcomes demonstrated a significant influence of the program on students' knowledge about bullying within the experimental group, and concurrently, these students expressed a high level of satisfaction with the program's implementation. The notable

enhancement in knowledge aligns with numerous studies involving adolescents, which have consistently demonstrated that educational intervention programs lead to a notable increase in knowledge within the experimental group. (e.g., Angeli et al., 2022; Hassandra et al., 2009). This is consistent with the findings of Kaveh et al. (2022), in their recent assessment of an intervention aimed at reducing aggression, which indicated a substantial enhancement in participants' knowledge during the post-test phase. As knowledge represents a sought-after outcome of education, its significance cannot be overstated. Effectively conveying the rationale behind the necessity for behavioral changes is of utmost importance (Arlinghaus, 2019). Previous research has indicated that one of the most effective approaches for educators to address the issue of bullying is to enhance their knowledge and awareness of the problem, along with its level of severity (Smith & Cowie, 1994; Eslea & Smith, 1998). Furthermore, Glick and Gibbs (2010) propose that effective education stands as a fundamental strategy for the prevention of aggression and violence. Our results emphasize the significance of prioritizing the application of the transfer of learning approach, particularly through the integration of life skills education (Botvin & Griffin, 2015), within the domain of school health promotion (Velasco et al., 2021).

In terms of satisfaction with the program, the experimental group indicated a significant improvement, in post-intervention measures. These results align with previous studies assessing the outcomes of educational programs (Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016; Nagy-Pénzes et al., 2022). The evaluation highlighted the students' enthusiasm for receiving education on this subject. Furthermore, the active involvement of a researcher in the school environment, contributed to fostering students' receptiveness to the program and establishing a strong rapport with them, a crucial element for successful collaboration (Nagy-Pénzes et al., 2022). These findings validate prior research results indicating that adolescents exhibit a preference for educational programs characterized by

interactive elements, including drama and role-playing, as opposed to purely informational content (Hallward & Duncan, 2019). The efficacy of such interventions is heightened when supplemented with in-person interaction, affording adolescents the opportunity for self-directed knowledge and skill acquisition (Elbe & Brand, 2016).

However, the analysis revealed that there were no significant differences between the control and experimental groups in the post-intervention measures, specifically in the constructs of the Theory of Planned Behavior (TPB), including attitudes toward aggressive behavior, perceived behavioral control (PBC), and subjective norms. This can be attributed to the requirement for additional sessions and a more intensive approach (Ttofi et al., 2011), to achieve statistically significant effects in our results. However, our findings share a resemblance with the research conducted by Kaveh et al. (2022), which reported a lack of significant differences between the experimental and control groups in relation to attitudes and subjective norms. The authors attributed the absence of a significant effect to the necessity for parental and peer involvement in the intervention. Indeed, external factors originating from peers, family, and other influences may also exert a substantial influence on the subjective norm variable (Raskauskas & Stoltz, 2007). More particularly, peers likely play a significant role in amplifying the frequency and severity of bullying behavior (Swearer et al., 2017). Conversely, Khaleghi et al. (2023), identified significant differences in the experimental group across all the constructs of the TPB. Nonetheless, the post-intervention assessment was administered three months following the implementation of the intervention, in contrast to our evaluation, which took place one week after the program's conclusion.

Regarding, attitudes toward aggressive behavior, they remained relatively stable, possibly due to the initially low scores recorded at baseline (mean score 1.99 in pre-intervention assessment). It's important to note that our intervention was not focused on specific risk levels but rather applied universally, encompassing all students regardless of their initial risk level for

aggressive behavior. These findings may be attributed to self-reporting biases, which encompass two critical elements: acquiescence bias, characterized by respondents' tendency to agree with all questions and respond affirmatively when uncertain, and social desirability bias, where respondents furnish information in a manner they perceive as socially desirable (Phillips & Clancy, 1972).

Regarding the variable of controlling aggressive behavior, the results revealed no significant differences between the control and experimental groups following the intervention, aligning with meta-analytic findings (Deby Ng et al., 2020; Yeager et al., 2015), which have indicated that prevailing educational interventions have generally shown limited to moderate impact in addressing both traditional bullying perpetration among adolescents. This could also be attributed to the use of self-reported questionnaires, which presents challenges, particularly in the context of self-reporting as a perpetrator of bullying, given the harmful nature of such conduct. Despite the assurance of anonymity, there remains a noteworthy risk of individuals underreporting their involvement in such behavior (Hauge et al., 2009). Furthermore, it is noteworthy that the evidence suggests slightly more favorable outcomes when the program is tailored for at-risk youth rather than being applied universally (Bradshaw, 2015; Ferguson et al., 2007).

It is crucial to approach the interpretation of the study's findings with caution, considering the inherent limitations. In the first place, the use of self-reported questionnaires may introduce response biases, which could impact the precision and dependability of the gathered data. As previously mentioned, the measurement of behavior, relying on self-reports, is susceptible to potential biases arising from factors such as individuals' limited self-awareness of their own behavior and a motivation to portray themselves as more health-conscious than their actual practices. A second limitation pertains to experimental bias (Greenberg & Folger, 1988; Rosenthal & Fode, 1963), as one of the researchers administered the intervention program to

the students. The influence of the program's administrator significantly molds students' behavioral responses, encompassing factors such as motivation, engagement with the program's content, and overall satisfaction (Valero Valenzuela et al., 2019). This introduces an added potential for compromising the internal validity of intervention studies. Future research should prioritize comprehensive training for educators prior to the intervention's implementation. The implementation of the current program and its ensuing evaluation results hold promise for enhancing the personal and professional growth of both participating educators and prospective teachers. Moreover, forthcoming research should take into account three pivotal factors contributing to the variable outcomes of interventions: shifts in the manifestation of problematic behavior, alterations in the underlying causes of such behavior, and adjustments in the efficacy of general behavior-change techniques (Yeager, 2015). Additionally, in complement to this final point, the establishment and application of evidence-based programs represent a time-intensive endeavor, with heightened prospects of success contingent upon their steadfast and unwavering implementation (Inman et al., 2011).

Conclusions

In summary, despite the theoretical underpinning of the TPB, which posits that attitudes, perceived behavioral control (PBC), and subjective norms impact intentions, our findings reveal that the H.E.R.O. program did not result in enhancements in those variables. Nevertheless, noteworthy enhancements were observed in students' knowledge concerning bullying behavior, alongside a substantial level of satisfaction expressed by the students regarding the program. Despite the limitations, the significance of these findings bears considerable relevance for interventions targeting the prevention of bullying behavior among elementary students in Greece.

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Chapter 6

Study 5

Evaluating the effectiveness of the health education program “I do not smoke, I exercise”: A follow-up study

Abstract

In this follow-up study, we aimed to assess the effectiveness of the “*I do not smoke, I exercise*” anti-smoking preventive health education program. This program, grounded in the Theory of Planned Behavior (TPB) and supplemented with life skills instruction, was targeted at high school students. The intervention comprised ten one-hour online sessions, administered by physical education instructors. The study cohort comprised 222 students (109 boys, 113 girls) from 11 secondary schools, with an average age of 16.42 ± 1.36 years. Data collection involved pre- and post-intervention self-assessment questionnaires. Results revealed a noteworthy enhancement in students' knowledge regarding smoking, perceived behavioral control (PBC), and overall program satisfaction following the intervention. Conversely, no significant alterations were observed in TPB-related smoking variables. These findings bear substantial implications for the design and implementation of smoking prevention initiatives in the Greek context.

Keywords: Adolescents, smoking, education, intervention

INTRODUCTION

In 2019, tobacco was a significant contributor to the global disease burden, accounting for 15.4% of all deaths, roughly 8.71 million (GBD 2019 Risk Factors Collaborators, 2020) . This was primarily due to non-communicable diseases linked to smoking (WHO, 2020). The existing literature provides substantial evidence that cigarette smoking is associated with a broad spectrum of diseases (Larsson & Burgess, 2022), notably lung cancer and other types of cancer (Dai et al., 2022; Gandini et al., 2008; Lopez et al., 2006; Morton et al., 2005), chronic obstructive pulmonary disease (Christenson et al., 2022; Dai et al., 2022), and types of cardiovascular diseases (Nowbar et al., 2019; Salazar-Martínez et al., 2002). Given that, half of its consumers face mortality due to smoking (WHO, 2021), preventing smoking initiation and implementing targeted interventions promises significant long-term health benefits (GBD 2019 Tobacco Collaborators, 2021; Jha & Peto, 2014).

Healthy behaviors established in early life tend to persist into adulthood (Sawyer et al., 2012). Smoking behavior typically takes root during adolescence, with the majority of adolescents trying their first cigarette or becoming addicted before reaching the age of 18. (Hu et al., 2020; Miech et al., 2017; WHO, 2020). For example, over 80 percent, of adult heavy smokers were heavy smokers during adolescence (Wiener et al., 2016). On the other hand, interventions aimed at influencing unhealthy behaviors among youth, particularly smoking, have strategically focused on the school environment (Bonell et al., 2013; Thomas et al., 2015). There is empirical evidence confirming the efficacy of integrated school health approaches in reducing rates of various adolescents' health behaviors, including smoking (Mélard et al., 2020; Sevil et al., 2019; Shackleton et al., 2016). As illustrated by a comprehensive examination of systematic reviews conducted by Das et al. (2016), it was indicated that school-based preventive initiatives and intensive family-centered interventions, particularly those

emphasizing the enhancement of family dynamics, have shown effectiveness in reducing smoking behaviors.

In recent years, there has been a substantial surge in internet accessibility and computer use, notably among the younger demographic, where in a significant portion of their time is allocated towards computer-based activities (Dam et al., 2023). An alternative method for delivering health promotion interventions is through internet-based interventions. Web-based health education offers independence, convenient accessibility, cost-effectiveness, easily updatable content, and the potential for increased effectiveness through emerging technologies (Coşkun et al., 2019). These interventions can be implemented with large groups of adolescents, from different cultural backgrounds, in settings that provide a sufficient level of privacy (Prokhorov et al., 2010). A relevant review (Park & Drake, 2015) suggests the development of computer-tailored smoking prevention programs, as they hold promise for an effective smoking prevention strategy among adolescents (Cremers et al., 2012; de Josselin de Jong et al., 2014).

Developing health behavior interventions with a foundation in relevant theory is recommended for maximizing their effectiveness. The utilization of theory is underscored as a key element in the design, evaluation, and synthesis of interventions (Davis et al., 2015; Glanz & Bishop, 2010). Such behavioral frameworks, furnish a conceptual model for program designers and policymakers to identify key determinants and create impactful interventions (Hassandra et al., 2009; Kolovelonis et al., 2016; Tapera et al., 2020).

The TPB, widely utilized in predicting smoking behavior (e.g., Dadipoor et al., 2023; Kosmidou & Theodorakis, 2007; Sutha et al., 2023; Tseng et al., 2018), asserts that behavior is shaped by changeable cognitions (Ajzen, 1991). Specifically, it asserts that behavioral intention, representing an individual's motivation to act, is the immediate precursor of behavior. This intention is shaped by attitude (positive or negative appraisal of the specific behavior),

subjective norm (the perceived impact of influential individuals on behavior and their own adoption of it), and perceived behavioral control (the perceived capability to engage in the behavior), with PBC also directly impacting behavior (Ajzen, 1991, 2002). Ajzen (2002) emphasizes the importance of incorporating a theory in interventions targeting smoking behavior, as the belief in one's capacity to influence behavior significantly impacts both intentions and actual actions. Steinmetz et al. (2016) found that interventions based on the TPB had a notable positive impact on changing various health behaviors and related factors, according to their meta-analysis. Lareyre et al. (2021), after conducting a systematic review of TPB-based interventions for smoking behavior, found that the percentage of studies reporting a significant impact on smoking behavior, intention, attitude, subjective norm, or perceived behavioral control ranged from 42% to 50%. For example, results of studies applying health education behavior change interventions utilizing the TPB, with the aim of preventing smoking among adolescents, indicate significant effects on the TPB constructs post-intervention (e.g., Barati et al., 2015; Bashirian et al., 2021; Fathi et al., 2016; Kolovelonis et al., 2016; Theodorakis et al., 2008; Zhao et al., 2019).

Health promotion interventions have the potential to impact various dimensions of the self, including cognitive, behavioral, and motivational aspects, on an individual level (Arnold et al., 2019). Health education was initially defined as the capacity to comprehend, assess, and utilize health information in order to make informed decisions pertaining to one's health (Simonds, 1974). Systematic reviews highlight the effectiveness of school-based smoking prevention programs for children and adolescents, emphasizing a combination of social competence and social influences curricula in preventing smoking initiation (Stockings et al., 2016; Thomas et al., 2013, 2015). Long-term research has demonstrated the positive effects of life skills teaching on various substance use behaviors, including smoking (Botvin & Griffin, 2004). In what manner do life skills contribute to the well-being of adolescents? They do so by

furnishing them with the requisite knowledge, positive attitudes, and values necessary for a healthy future (Tiwari et al., 2020). Skills-based health education involves specifying knowledge, attitudes, and life skills to guide young individuals in adopting targeted behaviors and meeting outlined objectives, encompassing psychosocial competencies and interpersonal abilities crucial for effective decision-making, problem-solving, critical thinking, communication, relationship-building, empathy, and productive life management (Sherif et al., 2023; WHO, 2003). The incorporation of life skills into smoking reduction programs, whether delivered through cognitive behavior, or life skills modalities and implemented within a school-community framework, has demonstrated the potential to enhance adolescent smoking reduction rates (Cuijpers, 2002; La Torre et al., 2005; Lee & Kim, 2017). As an illustration, Velasco et al. (2017), conducted a drug abuse prevention program for Italian adolescents, employing a life skills-based approach. Encouragingly, this intervention demonstrated positive effects, not only in terms of reducing substance use behavior, and associated variables, but also in bolstering overarching protective factors such as normative beliefs, life skills, and various psychosocial outcomes. Concerning smoking behavior, Zhao et al. (2019) assessed the impact of a four-session high school intervention designed to modify students' smoking behavior, integrating life skills training and the Theory of Planned Behavior (TPB). The findings indicated enhanced attitudes and perceived behavioral control (PBC), although no substantial alterations were observed in smoking behavior, intention, and willingness. Consequently, it is recommended that programs place greater emphasis on integrating sessions that address attitudes.

Numerous studies have investigated both the immediate and enduring impacts of exercise on variables associated with smoking, such as nicotine cravings and withdrawal symptoms, as well as its potential role in smoking cessation (Angeli et al., 2018; Hatzigeorgiadis et al., 2016; Kosmidou et al., 2014). Exercise appears to exert a protective influence against smoking while

also enhancing the effectiveness of smoking cessation treatments (Hassandra et al., 2015; Smits et al., 2016; Ussher et al., 2014; Ussher et al., 2019). Research indicates the potential for concurrent modification of multiple health behaviors in adolescents, with positive shifts in both physical activity and smoking cessation presenting as particularly compatible objectives for dual behavior change (Horn et al., 2013; Olen et al., 2021; Theodorakis et al., 2003). On top of these, interventions grounded in the TPB have demonstrated effectiveness in promoting physical activity behavior when compared to interventions based on other theories (Abdi et al., 2014; Rhodes et al., 2021).

In sum, the above evidence encourages the development and implementation of a theory-based, school, health education program, targeting smoking prevention among adolescents. This article represents a follow-up study building upon prior research conducted by Kolovelonis et al. (2016). This follow-up study examines the effectiveness of the “*I do not smoke, I exercise*” web-based program, targeting a healthier lifestyle and smoking prevention among secondary students. Specifically, it evaluates an extended version by Kolovelonis et al. (2016), featuring ten tailored sessions for adolescents, with the hypothesis of positive effects on examined variables.

Method

Participants

There were 222 students (109 boys and 113 girls; M_{age} : 16.42 ± 1.36 years) from 11 secondary schools that voluntarily participated in the school-based intervention program “*I do not smoke, I exercise*”. Eleven physical education instructors voluntarily implemented the program, with both teachers and students participating in the study of their own accord.

Instruments

The assessment scales utilized in this study were grounded in the TPB model, encompassing measures of attitudes towards smoking, intention to smoke, subjective norm, and perceived behavioral control over smoking behavior, as outlined by Ajzen (2002, 2006). These scales, previously employed in research by Kolovelonis et al. (2016), were also translated into Greek for the purposes of this study. Exercise behavior, attitudes toward the program, and satisfaction with the program's content were also assessed. Furthermore, similar assessment tools have been employed to gauge the effectiveness and suitability of health education programs targeting behaviors like nutrition (Angeli et al., 2022).

Attitudes towards smoking. Attitudes towards smoking behavior were evaluated using a set of five questions “*For me smoking is...*” and the answer ranged in a 7-point bipolar adjective scale good-bad, silly-clever, healthy-unhealthy, pleasant-unpleasant, useful-unuseful. The responses were recorded on a 7-point bipolar adjective scale, encompassing dimensions such as good-bad, silly-clever, healthy-unhealthy, pleasant-unpleasant, and useful-unuseful.

Intention to smoke. The assessment of intention to smoke involved the inclusion of two specific items (e.g., “*I plan to smoke in the coming months*” and “*I will try to smoke in the coming months*”). Participants rated their responses on a 7-point Likert scale, ranging from 1 (signifying strong disagreement) to 7 (signifying strong agreement).

Subjective norm. Subjective norm assessment involved the use of two items: “*People important in my life believe that I will smoke in the next months*” and “*Great people in my life will like me to smoke in the next months*”. Participants indicated their responses on a 7-point Likert scale, ranging from 1 (indicating strong disagreement) to 7 (indicating strong agreement).

Perceived behavioral control (PBC). Participants' perceived competence in exerting control over their smoking behavior was evaluated using two items: “*It's entirely up to me whether I will smoke in the coming months*” and “*It is my responsibility if I smoke in the coming*”

months". Responses were recorded on a 7-point Likert scale, ranging from 1 (strongly agree) to 7 (strongly disagree).

Attitudes towards the program implementation. Participants were asked to provide their responses within the context of the prompt "*For me, the program is...*" using a 7-point Likert scale, which included bipolar word pairs such as good-bad, pleasant-unpleasant, attractive-unattractive, and useful-useless.

Satisfaction with the program. Participants' satisfaction with the program was assessed post-intervention, using six items ("*Using this program via computer and the internet was easy*", "*Using the computer and the internet through this program was easy*", "*I prefer to learn about such issues via the computer and the internet, rather than from a book*", "*I am satisfied with the texts in this program*", "*I am satisfied with the design of this program*", "*I am satisfied with the images I saw in the program*"). Responses were recorded on a 7-point Likert scale, ranging from 1 (indicating complete disagreement) to 7 (indicating complete agreement).

Knowledge about smoking. A 14-item questionnaire was developed to assess participants' knowledge regarding smoking, specifically focusing on the health consequences associated with smoking behavior. Example items included statements like "*Smoking brings difficulty breathing when exercising*", "*Smoking hardens and destroys arteries*", and "*Smoking causes cancer*". The questionnaire was tailored to meet the specific requirements of the program. It also covered aspects such as the risks of passive smoking from cigars and cigarettes, statistics on smoking prevalence in Greece compared to Europe, and factors influencing young individuals to start smoking. Participants responded to the questions using a 3-point scale (0 = no, 1 = I am not sure, 2 = yes), resulting in a smoking knowledge score ranging from 0 to 28.

Exercise behavior. For exercise behavior, students responded to the question: "*In your free time, how often do you engage in physical activity that induces sweating or heavy breathing?*" on a 7-point scale (0 = never, 6 = every day). This single-item question has

demonstrated satisfactory reliability and validity measures in previous studies (Booth et al., 2001).

Smoking behavior. Smoking behavior was assessed through a series of five yes-or-no questions based on a questionnaire adapted from previous studies (Kann et al., 2000; Kolovelonis et al., 2016; Sorensen et al., 2004). These questions gradually examined a participant's smoking history, starting with “*Have you ever tried smoking, even just 1 or 2 puffs?*”, “*Have you ever smoked 1 or more cigarettes every day for a whole month (30 days)?*”, “*Have you smoked even one day in the past month (30 days)?*”, “*Have you smoked on 20 or more days in the last month?*” and concluding with “*Do you smoke more than 10 cigarettes per day?*”.

Procedure

All participating students and their parents/guardians provided their consent to partake in the study. The program's materials and assessments were administered through the website <http://research.pe.uth.gr/health/>. Teachers who expressed interest in implementing the program completed a participation form and were subsequently provided access to the program's materials. Students utilized the usernames provided for pre-intervention questionnaires and reused them for post-intervention assessments. Teachers who successfully completed all sessions and encouraged student participation were awarded a certificate of attendance, in addition to receiving the evaluation results. The program offered downloadable materials featuring instructions, relevant sources, presentations, activities, games, teaching strategies, project work topics, pertinent websites, and more. It comprised ten one-hour sessions, as outlined in Table 1.

Table 1. Description of the “*I do not smoke, I exercise*” web-based program.

Sessions	Theoretical Construct	BCT	Contents	Activities
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1st	Attitudes Education	Shaping knowledge Natural consequences	Initial Evaluation – General knowledge about smoking	Create an antismoking message – Knowledge quiz: “What do we know about smoking?”
2nd	Education Attitudes Knowledge	Shaping knowledge Salience of consequences	Presentation: Research data about smoking – harmful effects of smoking on our body	Discuss; “what are the ingredients of a cigarette” – “Smoking causes...” - Passive smoking: "Is it dangerous?" – True or False? – Create your antismoking message – Homework in groups: I reread the information in the material and create a knowledge quiz”
3rd	Education Perceived behavioral control. Intention Life skills	Goal setting Monitoring of behavior Behavior substitution	Physical activity as an alternative to smoking behavior - Why exercise is important - what is aerobic exercise	Learn the benefits of exercise – presentation of research data- Discussion: “Does smoking affect my ability to exercise?” – Create your own positive and encouraging message about PA and smoking.
4th	Subjective norm Attitude Life skills	Behavioral experiments Health consequences Motivational interviewing	Effects of tobacco consumption – Smoking behavior and your body - What you need to know	Experimental activity: “Smoking bottle” – Presentation: “Smoking: effects on the body” – Discussion: “Why nicotine is addictive?”- Work team: “Interview family members, smokers & non-smokers”
5th	Education Perceived behavioral control. Attitudes Life skills	Information about social and environmental consequences Salience of consequences	Social effects of smoking – The negative effects of smoking compared to its enticing image	Facts: “Why do young people smoke?”– Worksheet: “Why do I have to imitate???”– Tobacco industry’s campaign to hide the hazards of smoking; Demystification of smoking advertisements

6th	Knowledge	Behavioral rehearsal	Practicing refusal skills - find	Brainstorming: “The BIG NO” –
	Life skills	Shaping knowledge	ways to intelligently say NO to	Teamwork: “Practice your big NO’s
	Attitudes	Comparative imagining of future outcomes	someone who offers you a cigarette - How an addiction can become more important to a person than family, friends, clubs, job, reputation	in possible scenarios” – Activity: “The red balloon” - create a poster with antismoking messages
7th	Perceived behavioral control	Action planning	Introduce a goal-setting technique – Introduction to problem-solving technique	“Setting my goals on smoking” – Brainstorming: “Barrier or Justification?”- Long-term Vs Short term consequences of smoking
	Life skills	Problem solving		
		Commitment		
8th	Knowledge	Action planning	Practice goal-setting and problem-solving techniques –	Self-assessment quiz: “How active are you?”- Set your
	Life skills	Commitment		goals to exercise daily – Physical activity pyramid
	Perceived behavioral control		Use these techniques to set your activity goals	
9th	Subjective norm	Information about antecedents	Transmit knowledge to others	Teamwork: “Develop a campaign about smoking and exercise” – Work in groups and create anti-smoking posters – “Share what you have learned with family and friends”
	Attitudes			
	Life skills	Provide healthy alternatives		
10th		Comparative imagining of future outcomes		
	Attitudes	Social comparison	Raising awareness for the harm smoking causes	Work in groups: “Writing Down Goals & Rewarding Yourself”- Organize an information day and inform your classmates about the consequences of smoking and the health benefits of exercise
	Subjective norm			

Data analysis

Descriptive statistics (means, standards deviations) and reliability index (Cronbach’s α) were calculated for both measurements. Then, separate paired samples *t*-tests with Cohen’s *d* effect sizes were calculated in order to examine possible differences on the dependent variables

(attitudes toward smoking, intention to smoke, subjective norms, PBC, attitudes toward the program's implementation, smoking knowledge, smoking behavior and exercise behavior) between pre and post intervention. All statistical analyses were conducted with IBM SPSS v 26.0. The p value was set at .05.

Results

Results from the paired samples t-tests showed significant differences on students' PBC ($t_{220} = -2.166, p < .05, d = .15$), and knowledge about smoking ($t_{217} = -5.605, p < .001, d = .38$) between pre and post-intervention measures. Students reported higher scores on PBC and knowledge about smoking after the implementation of the "*I do not smoke, I exercise*" health education program compared to their pre-intervention measure (Table 2). Students also reported that they were very satisfied with the implementation of the "*I do not smoke, I exercise*" health education program. In contrast, there were no significant differences on students' attitudes towards smoking ($t_{221} = 1.418, p = .158$), intention to smoke ($t_{221} = .534, p = .594$), subjective norm ($t_{221} = .193, p = .847$), attitudes toward the program's implementation ($t_{221} = -.975, p = .331$), smoking behavior ($t_{220} = -.907, p = .365$), and exercise behavior ($t_{221} = -1.232, p = .219$).

Table 2. Descriptive statistics, reliability index and significant differences between pre and post intervention measures on the "*I do not smoke, I exercise*" health education program.

Variables	Pre-intervention			Post-intervention		
	α	M	SD	α	M	SD
Attitudes towards smoking	.78	1.40	.58	.73	1.34	.62
Intention to smoke	.60	1.18	.50	.85	1.15	.59
Subjective norm	.59	1.33	.77	.84	1.32	.88
PBC	.48	4.51*	2.07	.86	4.92*	2.40

Attitudes toward the program's implementation	.90	5.31	1.61	.90	5.43	1.68
Knowledge about smoking	.68	21.67***	3.74	.80	23.45***	4.03
Smoking behavior	.73	.31	1.14	.79	.38	1.23
Exercise behavior	-	4.50	1.46	-	4.64	1.51
Satisfaction of the program	-	-	-	.90	5.72	1.39

M: Mean; *SD*: Standard Deviation; PBC: Perceived Behavioral Control; α : Cronbach's α reliability index;

* $p < .05$; *** $p < .001$

Discussion

The current study aimed to assess the effectiveness of a school-based health education program focused on preventing smoking among adolescents. Overall, the implementation of the program was deemed satisfactory. The findings highlighted that the most substantial impact of the program, as indicated by effect sizes, was the enhancement of students' knowledge of smoking behavior and the PBC variable. In accordance with previous research findings, these results demonstrate that health education programs exert a notable influence on improving students' knowledge (Angeli et al., 2022; Hassandra et al., 2009; Kolovelonis et al., 2016). Certainly, targeted education has been shown to enhance individual awareness and proficiency (Arlinghaus & Johnston, 2017). There is some evidence, that improving health literacy, through health education, can be advantageous in preventing smoking, aiding in smoking cessation, and preventing smoking relapse, along with addressing associated behaviors and issues (Li et al., 2022). However, a mere increase in knowledge does not necessarily translate to behavior change (Hewitt & Stephens, 2007), although Sorensen et al. (2012) have found that an increase in knowledge aids in fostering positive attitudes towards abstaining from smoking.

The program also demonstrated a notable impact on the PBC variable, a finding consistent with previous studies (Barati et al., 2015; Kolovelonis et al., 2016; Zhao et al., 2019).

This suggests that the incorporation of life skills and the use of behavior change techniques, such as behavioral practice and rehearsal, enhanced students' PBC and self-efficacy (Senkowski et al., 2019). In addition, PBC and attitudes towards smoking have been found as significant determinants of smoking intentions among students (Karimy et al., 2015; Tapera et al., 2020).

Nonetheless, the program did not have a significant impact on attitudes toward smoking, subjective norms, and intentions. In line with prior research (Kolovelonis et al., 2016; Zhao et al., 2019), students exhibited initially low negative attitudes towards smoking. This observation could be attributed to the diverse composition of the intervention group, encompassing both smokers and non-smokers. A targeted intervention on a specific subgroup, such as heavy smokers, might yield a more pronounced effect.

Concerning behavior variables, smoking, and exercise, no significant effects were found post-test. Results are in line with previous studies (Kolovelonis et al., 2016; Zhao et al., 2019) who indicated that their intervention failed to change smoking behavior. This could be explained from the findings of Davey et al., 2014, who noted that subjective norm exerts a potent influence on intention, and the challenge of altering this norm may be a factor contributing to the modest changes observed in smoking behavior. An alternative interpretation could be that students initially reported low levels of smoking, which may have posed a challenge in detecting significant changes in the post-test results. Nevertheless, it is noteworthy that a recent systematic review by Lareyre et al. (2021) revealed that none of the studies focusing on smoking prevention provided results pertaining to smoking behavior.

The post-test assessment revealed no significant alteration in the subjective norm variable. Subjective norms are predominantly shaped by the perspectives of influential individuals who hold sway over an individual's behavior (Kosmidou et al., 2008). This outcome aligns with the findings reported by Kolovelonis et al. (2016).

In recent research by Zhao et al. (2022), it was found that the subjective norm displayed a limited association with the intention variable. This finding is consistent with their earlier study, where the subjective norm emerged as the most resistant construct to intervention efforts (Zhao et al., 2019). Initiatives aimed at preventing tobacco use among adolescents, which target both peers and parents, bear considerable potential in reducing smoking rates. Future studies should consider influencing this context, emphasizing the pivotal role of such interventions, in adolescent's control of smoking behavior. Furthermore, exercise behavior showed no significant changes in the post-test, aligning with the earlier study by Kolovelonis et al. (2016). This limited impact could be attributed to the high levels of exercise behavior reported at the baseline.

In summary, students overwhelmingly welcomed the program, signifying a substantial influence on their satisfaction levels. This aligns with findings from comparable studies, highlighting students' keen interest in educationally theorized programs. Moreover, research outcomes (Angeli et al., 2022; Hasandra et al., 2009; Kolovelonis et al., 2016) indicate that integrating technology into health education program delivery serves as an effective method for augmenting the quality and effectiveness of these endeavors.

Regarding limitations of the study, the absence of control group should be noted. Furthermore, these differences among aspects of TPB may attribute to sample differences (different age groups and school contexts). It appears that interventions aimed at the adolescent population should be addressed distinctly, as these findings pertain specifically to this demographic. Future studies should contemplate the development of age-specific interventions. The implementation of the program in different ages and groups may give more efficient results. The employment of self-assessment questionnaires and the deficiency of instructional training for educators responsible for program implementation represent two potential constraints that could exert influence on the outcomes. Future school education

programs should consider the participation of peers and family. Future studies should consider measuring the impact of life skills on students used at the intervention.

Conclusions

In general, this intervention demonstrated limited effectiveness in positively influencing participants' smoking behavior and its immediate cognitive precursors, such as attitudes and intentions. Conversely, favorable outcomes were observed in participants' knowledge, perceived behavioral control (PBC), and overall program satisfaction. These results carry significant implications for smoking prevention initiatives within the context of Greece. This study underscores the imperative for additional scrutiny of tobacco control strategies within the high school settings of Greece.

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Chapter 7

General Conclusion

The primary objective of this dissertation was to assess the efficacy of four school-based educational and behavioral change programs designed to foster healthy dietary habits and physical activity, prevent doping use, and discourage smoking and alcohol consumption among adolescents. Furthermore, a secondary aim was to design, evaluate, and assess an intervention program aimed at preventing bullying among elementary school students. Each of the five studies incorporated the theoretical framework of the Theory of Planned Behavior (TPB) and employed the pedagogical approach of life skills teaching. The integration of life skills and behavior change techniques was implemented to facilitate participants' compliance with exercise routines and to bolster endeavors towards cultivating a healthier behavioral paradigm.

In Study 1, the intervention focused on encouraging a healthy diet and physical activity. It was found to be particularly effective in enhancing students' knowledge and in positively influencing their attitudes and behaviors towards healthy eating. However, it did not lead to significant changes in subjective norms, perceived behavioral control, or intentions. Moreover, participants expressed high levels of satisfaction with the program's implementation.

Limitations

The study's limitation lies in relying on self-reported student behavior, which may be influenced by memory bias. Additionally, the absence of a control group should be acknowledged, as it could affect causal conclusions about the intervention's impact.

Study 2, aiming at doping prevention, exhibited a demonstrable enhancement in students' knowledge, intentions to acquire knowledge pertaining to doping, and their favorable disposition towards the program's implementation.

Limitations

It is important to note that the data relied on self-reported responses from students, which could introduce recall bias. Additionally, the study had a relatively small sample size, lacked a control group, and some of the instruments used (specifically PBC and knowledge assessments) exhibited low reliability.

Study 3, targeting alcohol consumption, the educational program exhibited notable improvements in students' knowledge, perceived behavioral control (PBC), and behaviors related to alcohol consumption. Of particular significance, the evaluation underscored the students' pronounced satisfaction with the program.

Limitations

Initially, it's crucial to recognize that relying on self-reported questionnaires can introduce response biases, potentially impacting the data's accuracy and reliability. Furthermore, an important consideration is that the teachers overseeing the program sessions lacked specific training, raising concerns about fidelity in implementation (Li et al., 2021).

Regarding study 4, despite the TPB's theoretical framework suggesting that attitudes, perceived behavioral control (PBC), and subjective norms influence intentions, our study shows that the bullying prevention program did not lead to improvements in these factors. However, there were significant improvements in students' knowledge of bullying behavior, and the students expressed a high level of satisfaction with the program.

Limitations

Firstly, reliance on self-reported questionnaires may introduce response biases, potentially affecting the accuracy and reliability of the collected data. This method of behavior measurement is susceptible to biases stemming from factors such as individuals' limited self-awareness and a tendency to present themselves as more health-conscious than their actual practices. A second limitation concerns experimental bias (Greenberg & Folger, 1988;

Rosenthal & Fode, 1963), as one of the researchers administered the intervention program to the students. The influence of the program's administrator significantly shapes students' behavioral responses, including factors like motivation, engagement with the program's content, and overall satisfaction. This introduces potential complications in the internal validity of intervention studies.

Regarding study 5, which constituted a subsequent investigation appraising the efficacy of a smoking prevention intervention, a noteworthy finding pertained to the substantial influence of participants' knowledge, alongside the intervention's impact on perceived behavioral control. However, no statistically significant effects were discerned concerning participants' smoking behavior and the variables associated with the remaining variables of TPB.

Limitations

It is imperative to note the absence of a control group in this study, in conjunction with the reliance on self-administered questionnaire assessments.

Cumulatively, the primary observation across all five interventions was a statistically significant improvement in students' knowledge following the post-test assessments, as evidenced in all five studies. More specifically, the outcomes of each intervention demonstrated a statistically significant divergence in students' knowledge pertaining to nutrition, doping, and smoking. In the case of alcohol consumption and bullying, the experimental group exhibited a notably elevated level of knowledge post-intervention in comparison to the control group. Health education programs exert a considerable influence on augmenting students' knowledge, confirming research findings (Daher et al., 2021). This finding emphasizes the critical significance of the transfer of learning methodology, particularly through the application of life skills instruction (Botvin & Griffin, 2015), within the domain of school-based health promotion

(Velasco et al., 2021).

Gaining knowledge about a specific health behavior enhances individuals' awareness of the fundamental principles driving behavior modification (Arlinghaus & Johnston, 2018). Furthermore, prior research has underscored that educators' efficacy in addressing bullying hinges on their enhanced understanding and heightened awareness of the issue, along with its gravity (Smith & Cowie, 1994; Eslea & Smith, 1998). Similarly, regarding the other behaviors, acquiring knowledge through educational interventions plays a pivotal role in bolstering resistance and averting doping behavior among adolescents (Chan et al., 2016). Likewise, there is discernible evidence that augmenting health literacy through targeted health education initiatives yields benefits in the realms of smoking prevention, cessation support, relapse prevention, and the management of associated behaviors and concerns (Li et al., 2022). Given its status as a coveted outcome of education, the importance of knowledge acquisition cannot be overstated.

Additionally, it is noteworthy that all participants expressed a high level of satisfaction with the programs, which was consistent among all five students. This discovery corroborates existing literature, where it has been consistently reported that students enthusiastically embrace such programs, thereby indicating a substantial impact on their satisfaction levels. This observation is in alignment with the findings of analogous studies, underscoring students' pronounced interest in pedagogically structured initiatives. Furthermore, research findings (Hasandra et al., 2009; Kolovelonis et al., 2016) provide evidence that the incorporation of technology into the delivery of health education programs effectively enhances their quality and overall effectiveness.

Implication – Future studies

The findings from the aforementioned studies suggest that school curricula should incorporate comprehensive health education programs. These outcomes bear significant

implications for initiatives promoting healthy behaviors and preventing unhealthy, among adolescents, particularly within Greek school settings.

Moreover, the research underscores the necessity for health education initiatives encompassing the regulation of alcohol and smoking, dissemination of information and knowledge regarding doping and substance use, promotion of healthy dietary habits, and provision of mental and cognitive support to address negative emotional states such as anxiety and aggression. These studies also indicate that through subsequent evaluation outcomes, there is potential to enhance both the personal and professional growth of participating educators, as well as those aspiring to enter the field. The studies exhibited several strengths, including the integration of TPB components, life skills education, and technology utilization. Comprehensive approaches to health education programs, complemented by a theoretical framework and the incorporation of exercise as a contributing factor, have shown efficacy in impacting behavioral factors among adolescents. The application of a theory-driven educational intervention focused on skill enhancement proved to be efficacious for this demographic. Future studies should consider incorporating teachers or parents, given that parental involvement is recommended for enhancing the effectiveness of educational interventions (McDermott et al., 2023). Additionally, they should emphasize thorough training for educators before implementing an educational intervention. The development of health education interventions based on other types of behavioral change theories such as the Health Belief Model (Becker & Maiman, 1975), Transtheoretical Model (Prochaska & Di Clemente, 1982), and Social Cognitive Theory (Bandura, 1986) is highly proposed.

The implementation and evaluation of these 5 interventions, show potential for advancing the personal and professional development of both participating educators and future teachers. To sum up, it is important to note that, establishing and utilizing evidence-based programs is a

time-intensive process, with increased chances of success hinging on their consistent and unwavering application (Inman et al., 2011).

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Εσωτερική Επιτροπή Δεοντολογίας

Τρίκαλα:

7/12/2022

Αριθμ. Πρωτ: 2011

Βεβαίωση έγκρισης της πρότασης για διεξαγωγή Έρευνας με τίτλο: Ανάπτυξη και Διδασκαλία

Προγραμμάτων Αγωγής Υγείας Μέσω Νέων Τεχνολογιών: Διατροφή, Κάπνισμα, Αλκοόλ, Ντόπινγκ και Βίαιη Συμπεριφορά

Επιστημονικώς υπεύθυνος-η / επιβλέπων-ουσα: Ιωάννης Θεοδωράκης

Ιδιότητα: Καθηγητής

Ίδρυμα: Πανεπιστήμιο Θεσσαλίας

Τμήμα: Επιστήμης Φυσικής Αγωγής και Αθλητισμού

Κύριος ερευνητής-τρια / φοιτητής-τρια: Μαρία Αγγέλη

Πρόγραμμα Σπουδών: Διδακτορικό

Ίδρυμα: Πανεπιστήμιο Θεσσαλίας

Τμήμα: Επιστήμης Φυσικής Αγωγής και Αθλητισμού

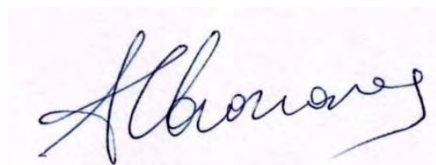
Η προτεινόμενη έρευνα θα είναι: Διπλωματική εργασία

Τηλ. επικοινωνίας: 6974865922

Email επικοινωνίας: maria.angeli87@yahoo.com

Η Εσωτερική Επιτροπή Δεοντολογίας του Τ.Ε.Φ.Α.Α., Πανεπιστημίου Θεσσαλίας
μετά την υπ. Αριθμ. 1-4/7-12-2022 συνεδρίασή της εγκρίνει τη διεξαγωγή της
προτεινόμενης έρευνας.

Ο Πρόεδρος της
Εσωτερικής Επιτροπής
Δεοντολογίας – ΤΕΦΑΑ

A handwritten signature in blue ink, appearing to read 'Αθανάσιος' (Athanasios), is written over a light pink rectangular background.

Τσιόκανος Αθανάσιος
Καθηγητής

ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΙΑΣ
ΤΜΗΜΑ ΕΠΙΣΤΗΜΗΣ ΦΥΣΙΚΗΣ ΑΓΩΓΗΣ ΚΑΙ ΑΘΛΗΤΙΣΜΟΥ

ΑΝΩΝΥΜΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ

Παρακαλώ πολύ, συμπληρώστε προσεκτικά τις παρακάτω ερωτήσεις.

Προσωπικά Στοιχεία

1. Φύλο: Άνδρας ☐ Γυναίκα ☐

2. Ημερομηνία γέννησης: (π.χ. 12/10/1995)

3. Ηλικία: (σε έτη)

Για κάθε μία από τις ερωτήσεις απάντησε ειλικρινά κυκλώνοντας τον αριθμό που αντιπροσωπεύει τις απαντήσεις σου. Προσπάθησε οι απαντήσεις σου να αφορούν στους 2 τελευταίους μήνες.

Βίαση συμπεριφορά (να φωνάζω, να κλωτσήσω, να βρίσω, να ουρλιάξω, να απειλήσω, να πιέσω, να καταστρέψω αντικείμενα, να μιλήσω ειρωνικά, να απορρίψω κάποιον).

Για μένα, το να έχω βίαση συμπεριφορά είναι:

καλό :---7---:---6---:---5---:---4---:---3---:---2---:---1---: **κακό**

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

έξυπνο :---7---:---6---:---5---:---4---:---3---:---2---:---1---: **ανόητο**

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

υγιεινό :---7---:---6---:---5---:---4---:---3---:---2---:---1---: **ανθυγιεινό**

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

ευχάριστο :---7---:---6---:---5---:---4---:---3---:---2---:---1---: **δυσάρεστο**

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

χρήσιμο :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: άχρηστο

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Σκοπεύω να ελέγχω την βίαιη συμπεριφορά μου

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Θα προσπαθήσω να ελέγξω την βίαιη συμπεριφορά μου:

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Άτομα σημαντικά στη ζωή μου θα ήθελαν να προσέχω πώς συμπεριφέρομαι στους άλλους

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Σπουδαία άτομα στη ζωή μου θα ήθελαν να προσέχω πώς συμπεριφέρομαι στους άλλους

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Μπορώ να ελέγχω την βίαιη συμπεριφορά μου

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Είναι δική μου ευθύνη αν θα ελέγχω την βίαιη συμπεριφορά μου

Συμφωνώ :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Για μένα το πρόγραμμα αυτό για την βίαιη συμπεριφορά, θα είναι:

καλό :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: κακό

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

ελκυστικό :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: απωθητικό

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

χρήσιμο :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: άχρηστο

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

ευχάριστο :---7-----:---6-----:---5-----:---4-----:---3-----:---2-----:---1---: δυσάρεστο

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Το πρόγραμμα αυτό ήταν εύκολο

Συμφωνώ :-----:-----:-----:-----:-----:-----:-----: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Προτιμώ να μαθαίνω για τέτοια θέματα μέσω ενός προγράμματος, παρά από ένα βιβλίο

Συμφωνώ :-----:-----:-----:-----:-----:-----:-----: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Είμαι ικανοποιημένος/η από τα κείμενα που είχε το ΠΡΟΓΡΑΜΜΑ ΑΥΤΟ

Συμφωνώ :-----:-----:-----:-----:-----:-----: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Είμαι ικανοποιημένος/η από το σχεδιασμό που είχε το ΠΡΟΓΡΑΜΜΑ ΑΥΤΟ

Συμφωνώ :-----:-----:-----:-----:-----:-----: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

Είμαι ικανοποιημένος/η από τις εικόνες που είδα στο ΠΡΟΓΡΑΜΜΑ ΑΥΤΟ

Συμφωνώ :-----:-----:-----:-----:-----:-----: Διαφωνώ

πολύ αρκετά λίγο έτσι κι έτσι λίγο αρκετά πολύ

1. Ο εκφοβισμός είναι ένας τύπος επιθετικής συμπεριφοράς που επαναλαμβάνεται συνεχώς.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

2. Ο εκφοβισμός είναι συναίσθημα και όχι συμπεριφορά.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

3. Ο συμπαραστάτης αντιστέκεται στο άτομο που εκφοβίζει.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

4. Για να υποστηρίξω κάποιον που δέχεται βίαιη συμπεριφορά, ενημερώνω έναν ενήλικα.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

5. Η άσκηση δεν σχετίζεται με τη μείωση του άγχους.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

6. Η συναισθηματική νοημοσύνη είναι η ικανότητα αναγνώρισης των συναισθημάτων του άλλου.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

7. Το να μιλώ θετικά στον εαυτό μου, συμβάλλει στην αύξηση της αυτοπεποίθησής μου.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

8. Η θετική σκέψη μπορεί να ωφελήσει τα άτομα που εκφοβίζονται.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

9. Τα παιδιά που επιδεικνύουν δυσκολίες στην επίλυση προβλημάτων κινδυνεύουν περισσότερο να εκφοβίζονται και να γίνουν οι ίδιοι στόχοι εκφοβισμού.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

10. Ο διαδικτυακός εκφοβισμός είναι μια μορφή βίαιης συμπεριφοράς με πολύ λιγότερες συνέπειες από τον σωματικό εκφοβισμό.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

11. Η έμμεση βοήθεια και η υποστήριξη, σε κάποιον που δέχεται εκφοβισμό, δεν είναι τόσο αποτελεσματική όσο η αντιπαράθεση.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

12. Ο ρόλος του Συμπαραστάτη και του Παρατηρητή είναι όμοιοι.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

13. Η βία στα σπορ, εκφράζεται κυρίως σε αθλητικούς χώρους γιατί είναι απρόσωποι, με αποτέλεσμα να ευνοούνται τέτοιου είδους εκδηλώσεις.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

14. Η προσβολή δεν αποτελεί εκφοβισμό.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

15. Για να αντιμετωπίσω μια πιθανή έκρηξη θυμού, θα συνίσταται να εφαρμόσω μια στρατηγική αυτορρύθμισης, όπως η τεχνική αναπνοής ή η αυτο-ομιλία.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

16. Τα παρατσούκλια και οι χαρακτηρισμοί δεν αποτελούν κάποιο είδους εκφοβισμού.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

17. Τα παιδιά που εκφοβίζουν έχουν χαμηλή αυτοεκτίμηση και άλλα προβλήματα συμπεριφοράς.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

18. Η έλλειψη αγωγής από την οικογένεια και το σχολείο οδηγούν σε επιθετικές συμπεριφορές.

α) ΝΑΙ

β) ΟΧΙ

γ) ΔΕΝ ΓΝΩΡΙΖΩ

Η επόμενη ερώτηση αφορά συναισθήματα θλίψης (έντονης στενοχώριας)

Κατά τη διάρκεια των τελευταίων 2 μηνών, αισθάνθηκες ποτέ τόσο λυπημένος/η ή απελπισμένος/η, κάθε μέρα ή για τουλάχιστον 2 συνεχείς εβδομάδες, ώστε να σταματήσεις να ασχολείσαι με μερικές από τις συνηθισμένες δραστηριότητές σου;

0. Ναι

1. Όχι

Παρακάτω υπάρχει ένας αριθμός ερωτήσεων που σχετίζονται με τη συμπεριφορά σου και την υγεία σου. Φέρτε στο μυαλό σας πώς αισθανθήκατε γενικότερα τους τελευταίους 2 μήνες.

1. Πόσο πολύ προσέχεις τη συμπεριφορά σου;

1	2	3	4	5	6	7
Καθόλου	Πολύ λίγο	Λίγο	Έτσι κι έτσι	Αρκετά	Πολύ	Πάρα πολύ

2. Πόσο πολύ προσπαθείς να ελέγξεις το θυμό σου;

1	2	3	4	5	6	7
Καθόλου	Πολύ λίγο	Λίγο	Έτσι κι έτσι	Αρκετά	Πολύ	Πάρα πολύ

3. Στον ελεύθερό σου χρόνο, πόσο συχνά συνήθως ασκείσαι σωματικά τόσο ώστε να ιδρώνεις ή να λαχανιάζεις;

0	1	2	3	4	5	6
Ποτέ	Λιγότερο από μια φορά το μήνα	Μια φορά το μήνα	Μια φορά την εβδομάδα	2 με 3 φορές την εβδομάδα	4 με 6 φορές την εβδομάδα	Κάθε μέρα

4. Θα έλεγες ότι η υγεία σου είναι:

1	2	3	4
Η υγεία μου είναι Κακή	Η υγεία μου είναι Μέτρια	Η υγεία μου είναι Καλή	Η υγεία μου είναι Πολύ καλή

Σε ευχαριστούμε για την συμμετοχή σου!



Έντυπο συναίνεσης δοκιμαζόμενου σε ερευνητική εργασία

Τίτλος Ερευνητικής Εργασίας: Ανάπτυξη και Διδασκαλία Προγραμμάτων Αγωγή Υγείας μέσω Νέων Τεχνολογιών: βίαιη συμπεριφορά.

Επιστημονικός Υπεύθυνος-η: Γιάννης Θεοδωράκης, Καθηγητής, ΤΕΦΑΑ, ΠΘ, email:

***** , τηλ.: ***** **Ερευνητές:** Μαρία Αγγέλη ***** τηλ. *****

1. Σκοπός της ερευνητικής εργασίας

Σκοπός της μελέτης είναι να αξιολογηθεί η επίπτωση της εφαρμογής του προγράμματος της

βίαιης συμπεριφοράς, στις στάσεις, προθέσεις και την γνώση των μαθητών.

2. Διαδικασία

Οι συμμετέχοντες θα αξιολογηθούν 2 φορές απαντώντας στο ίδιο ερωτηματολόγιο αξιολόγησης γνώσεων και στάσεων αναφορικά με την κάθε συμπεριφορά. Πριν και μετά την εφαρμογή του εκάστοτε προγράμματος. Η συμπλήρωση των ερωτηματολογίων θα διαρκέσει 10'.

Κίνδυνοι και ενοχλήσεις

Δεν υπάρχει κανένας κίνδυνος τραυματισμού και ενοχλήσεων

3. Προσδοκώμενες ωφέλειες

Με την συμμετοχή σας θα λάβετε πολλές πληροφορίες και γνώσεις για την βίαιη συμπεριφορά, οδηγίες για το πως θα κατακτήσετε δεξιότητες, που θα σας χρησιμεύσουν στην καθημερινή σας ζωή. Επιπλέον θα συμβάλλετε στην βελτίωση του μελλοντικού σχεδιασμού προγραμμάτων αγωγής υγείας για την πρόληψη επιβλαβών για τη σωματική και ψυχική υγεία, συμπεριφορών.

Δημοσίευση δεδομένων – αποτελεσμάτων

Η συμμετοχή σας στην έρευνα συνεπάγεται ότι συμφωνείτε με την μελλοντική δημοσίευση των αποτελεσμάτων της, με την προϋπόθεση ότι οι πληροφορίες θα είναι ανώνυμες και δε θα αποκαλυφθούν τα ονόματα των συμμετεχόντων. Τα δεδομένα που θα συγκεντρωθούν θα κωδικοποιηθούν με αριθμό, ώστε το όνομα σας δε θα φαίνεται πουθενά.

4. Πληροφορίες

Μη διστάσετε να κάνετε ερωτήσεις γύρω από το σκοπό ή την διαδικασία της εργασίας. Αν έχετε οποιαδήποτε αμφιβολία ή ερώτηση ζητήστε μας να σας δώσουμε διευκρινίσεις.

5. Ελευθερία συναίνεσης

Η συμμετοχή σας στην εργασία είναι εθελοντική. Είστε ελεύθερος-η να μην συναινέσετε ή να διακόψετε τη συμμετοχή σας όποτε το επιθυμείτε.

6. Δήλωση συναίνεσης

Διάβασα το έντυπο αυτό και κατανοώ τις διαδικασίες που θα ακολουθήσω. Συναινώ να συμμετάσχω στην ερευνητική εργασία.

Ημερομηνία: __/__/__

Ονοματεπώνυμο και υπογραφή
συμμετέχοντος

Υπογραφή ερευνητή

Ονοματεπώνυμο και
υπογραφή
παρατηρητή

Ονοματεπώνυμο και
υπογραφή γονέα ή κηδεμόνα