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Balancing benefits and risks: a dual-valence model of bodybuilding participation among college students

Equilibrio entre beneficios y riesgos: un modelo de doble valencia de la participación en el culturismo entre estudiantes universitarios

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Abstract

This research study assessed the effect of perceived advantages and perceived disadvantages on college students' participation in bodybuilding, using a dual-valence framework. A cross-sectional, quantitative (50 university students from Metro Manila who participate in resistance training) study design was employed. The data were collected from a structured and validated questionnaire (Cronbach's $\alpha = 0.82$ to 0.91) assessing college students' perceived advantages, perceived disadvantages, and actual participation levels. Results were analyzed using SPSS, follow large sample descriptive statistics and Pearson's correlation coefficient, using .05 for the level of significance. The study's results indicate respondents have very highly perceived advantages ($M = 3.51$, $SD = 0.38$) and perceived disadvantages ($M = 3.57$, $SD = 0.48$); both showing the highest level of perceived advantages and disadvantages in physical dimensions. Overall student participation in bodybuilding is high ($M = 3.03$, $SD = 0.47$); related to time and frequency of participation. The Pearson correlation analysis revealed that there is a statistically significant ($p < 0.01$), moderate to strong positive correlation between perceived advantages and bodybuilding participation ($r = 0.694$). Conversely, there was a statistically insignificant ($p > 0.05$), low inverse correlation between perceived disadvantages and bodybuilding participation ($r = -0.21$). These findings indicate that the primary motivation for college students to participate in bodybuilding is due to their perceived advantages of participation, whereas their perceived disadvantages do not impact their decision to participate or influence their training regimen. The findings also supported the dual-valence model, indicating the importance of promoting safe, evidence-based resistance training practices in collegiate settings that focus on maximizing advantages while effectively controlling or minimizing risks of participation to enhance the health and safety of college students.

Keywords: bodybuilding participation; perceived benefits and risks; dual-valence model; exercise behavior; Physical Education

Resumen

Este estudio de investigación evaluó el efecto de las ventajas y desventajas percibidas en la participación de estudiantes universitarios en el culturismo, utilizando un marco de doble valencia. Se empleó un diseño de estudio transversal y cuantitativo (50 estudiantes universitarios de Metro Manila que participan en entrenamiento de resistencia). Los datos se recopilaron a partir de un cuestionario estructurado y validado (alfa de Cronbach = $0,82$ a $0,91$) que evaluaba las ventajas y desventajas percibidas, así como los niveles de participación reales de los estudiantes universitarios. Los resultados se analizaron utilizando SPSS, siguiendo estadísticas descriptivas de muestras grandes y el coeficiente de correlación de Pearson, utilizando $0,05$ para el nivel de significancia. Los resultados del estudio indican que los encuestados tienen ventajas percibidas muy altas ($M = 3,51$, $DE = 0,38$) y desventajas percibidas ($M = 3,57$, $DE = 0,48$); ambas mostrando el nivel más alto de ventajas y desventajas percibidas en dimensiones físicas. La participación general de los estudiantes en el culturismo es alta ($M = 3,03$, $DE = 0,47$); relacionada con el tiempo y la frecuencia de participación. El análisis de correlación de Pearson reveló una correlación positiva, de moderada a fuerte y estadísticamente significativa ($p < 0,01$) entre las ventajas percibidas y la participación en el culturismo ($r = 0,694$). Por el contrario, se observó una correlación inversa baja, estadísticamente no significativa ($p > 0,05$), entre



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las desventajas percibidas y la participación en el culturismo ($r = -0,21$). Estos hallazgos indican que la principal motivación de los estudiantes universitarios para participar en el culturismo se debe a las ventajas percibidas de la participación, mientras que las desventajas percibidas no influyen en su decisión de participar ni en su régimen de entrenamiento. Los resultados también respaldan el modelo de doble valencia, lo que subraya la importancia de promover prácticas de entrenamiento de resistencia seguras y basadas en la evidencia en entornos universitarios, que se centren en maximizar las ventajas y, al mismo tiempo, controlar o minimizar eficazmente los riesgos de la participación para mejorar la salud y la seguridad de los estudiantes.

Palabras clave: participación en el culturismo; beneficios y riesgos percibidos; modelo de doble valencia; comportamiento en el ejercicio; Educación Física.

Introduction

Engagement on a consistent basis, both in terms of frequency, duration and intensity, through physical activity, is essential for achieving and maintaining optimal levels of physical condition, psychological well-being, and functional capacity (primarily during young adulthood, as well as providing a foundation for lifetime healthy behaviors). Among the many options or modalities for exercise, resistance training and bodybuilding are becoming increasingly popular among college/university students, not only because of the effectiveness of these activities to produce gains in muscular strength, body composition (or fat mass to lean mass ratio), as well as improvements in overall physical fitness, but because of the multitude of positive impacts they can have on our body, mind, and academic performance (Currier et al., 2023; Fyfe et al., 2021). Information from studies via systematic reviews or meta-analyses provide sufficient evidence to support the conclusion that strength training using resistance training (progressively overloading in accordance with an individual's students' physical abilities) can significantly increase both muscle strength and muscle mass (hypertrophy) in healthy adults (Currier et al., 2023; Pallarés et al., 2021). In addition to the physiological benefits of resistance training, research has also revealed that resistance training has several psychological and academic advantages for students enrolled in college/university programs. Regular participation in structured exercise has been associated with reduced stress and anxiety, improved emotional regulation and increased overall mental well-being (Margulis et al., 2023; Hu & Liu, 2025). Other studies have demonstrated a strong positive relationship between

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participation in physical activity and improved cognitive function and improved performance in the classroom, enhancing the overall developmental process of students (Fraile-Martínez et al., 2024). Collectively, the multidimensional benefits of bodybuilding as a part of a health promotion strategy can help support and promote the well-being of college/university students in the higher education environment. Despite the benefits provided to college/university students from participating in exercise on a regular basis, many students have difficulty maintaining a regular exercise routine. Longitudinal studies indicate that a large percentage of individuals will stop participating in structured exercise programs after the first 12 months, even with high initial levels of motivation (Gjestvang et al., 2021). Adherence to exercise has been found to be impacted by several psychosocial variables; namely self-efficacy, motivation, emotional experiences, and perceived barriers (Andre et al., 2024; An et al., 2024). Evidence suggests that social support and self-efficacy are critical predictors of college students' continued participation in physical activity (Zhang, Hasibagen, & Zhang, 2022; Zhang, Lin, et al., 2022).

While bodybuilding and resistance training contain a number of benefits, it should be recognized that there are also potential risks associated with participating in these activities. Among these risks are physical injuries (e.g., musculoskeletal injuries) that occur as a result of participating in resistance training, which occurs from either overloading oneself, exercising with improper form, or inadequate recovery (Grier et al., 2022; Tung et al., 2024). Epidemiological data has shown a high incidence of injuries among gym/weightlifters, with the shoulder, knee and lower back being the most frequently injured areas (Alrushud, 2024; Islam et al., 2024; Bukhary et al., 2023). In addition, psychological/behavioral risks have also been associated with participation, such as dissatisfaction with body image, compulsive exercise behaviors, and exercise addiction, all of which can have a negative impact on one's mental health or well-being (Godoy-Izquierdo et al., 2021; Jiménez-Limas et al., 2022). There has been a correlation between bodybuilding's muscularity drive and muscle dysmorphic disorder and psychological distress, particularly within the male population (Terhoeven et al., 2023). In addition, the use of performance-enhancing substances is also associated with numerous health, ethical, and safety issues within the university student population

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(Constantinou & Aguiyi, 2022; Badr el Dine & Attia, 2022). The existing literature examining the risks and benefits of resistance training has generally been conducted independently of one another, with the exception of a limited number of integrative studies that have considered the two perceptions as they relate to resistance training at the same time. Most of the frameworks developed utilize one of the two components of motivation (e.g., motivational drivers or motivational barriers). Therefore, there is currently a gap in knowledge regarding how individuals integrate the perceived benefits of participation with the perceived risks of participation when developing their personal exercise (bodybuilding) behaviors. This fragmented method of approach limits a complete understanding of participation in bodybuilding, specifically for college students. For this reason, the researchers have focused on research in the dual-valence framework, which allows for the simultaneous examination of perceptions of risk/reward (either positive or negative) that impact individuals' decisions to participate. This research used a dual-valence approach and designed to investigate the perceived benefits, as well as risks, of going to the gym, and how these perceptions were used to make the decision to become involved with the sport of bodybuilding. The development of this dual-valence framework provided an integrated model for both positive and negative evaluations of individual exercise behaviors and served to enhance the understanding of these behaviors within the realm of safe, effective, and sustainable programming at the collegiate and university levels.

Literature review

Resistance training and bodybuilding among college students

Resistance training or weightlifting is popularly practiced by college students through age-related physical activity. There's been consistently demonstrated potential for resistance training to develop muscle, build muscle tissue, and create functional muscle (Currier et al., 2023; Fyfe et al. 2021). All research, including systematic reviews and meta-analyses indicate resistance program design was beneficial to many types of people across multiple populations (Pallarés et al., 2021). Therefore, program design needs careful selection of key training variables, such as program intensity, program volume, and proper exercise design in order to maximize desired outcomes (Hobein et

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al., 2026). Increasingly, resistance training is provided for students who are eligible to participate in campus wellness programs as part of student success initiatives within the university context. However, there is inconsistency in college students' participation in these initiatives and their long-term retention in their exercise programs. Thus, it could be suggested that the physiological adaptations and improvements in one's functional capacity due to regular exercise are not sufficient alone to allow long-term participation; therefore, psychological and behavioral factors must also play an important role in influencing college students' participation in resistance exercise or weightlifting.

Perceived benefits of bodybuilding

The competitive sport of bodybuilding has multiple advantages in addition to its positive physical effects and the positive effects of participation in resistance training (i.e., Improved muscle strength, increased lean body mass /weight loss, improved health status) (Currier et al., 2023). People who engage in a structured exercise program will generally report that it has improved their emotional regulation/management and has decreased their feelings of stress and anxiety (Margulis et al., 2023; Hu & Liu, 2025). In addition to its physical benefits to the body, there are positive emotional effects from bodybuilding which may include an improved body image and self-perception; these effects will depend on specific and contextual factors (Wang et al., 2023). Perceived benefits (i.e., improved appearance, strength and confidence) are regarded as having strong motivational value and as influencing long-term commitment to an exercise regimen; these perceived benefits are expected to be an influencing factor in a participant's decision to engage and continue to engage in bodybuilding activities (An et al., 2024).

Exercise participation and adherence

Although resistance training has been proven to have many positive effects, finding ways to continue to regularly exercise and engage in physical activity has proven to be difficult for college students. Data from longitudinal studies show that the vast majority of individuals will stop participating in formalized exercise programs after their first year of regular participation (Gjestvang et al., 2021). This data indicates that exercise adherence is a multifaceted and complicated phenomenon, as adherence to exercise is determined by a number of physical and psychosocial variables. Several researchers have

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explored the relationship between exercise behavior and the following elements: self-efficacy; emotional intelligence; social support; and commitment to exercising (Andre et al., 2024; An et al., 2024). In this regard, social support appears to be a variable that can indirectly impact participation in exercise by influencing an individual's level of self-efficacy (Zhang, Hasibagen, & Zhang, 2022). Additionally, a commitment to exercise has been identified as a significant predictor of exercise behavior (independent of intention-based models) (Zhang, Lin, et al., 2022). This research has demonstrated that a complete understanding of bodybuilding participation must involve examining both motivational and cognitive mechanisms.

Dangers encountered with bodybuilding along with resistance exercise programs

Bodybuilders generally appreciate the many advantages of lifting weights; however, they encounter many dangers too concerning their participation. When weight trainers suffer physical dangers, almost always, they suffer physical injuries to their muscles and bones. Injuries result mainly from performing exercises incorrectly, weight training at an intensity that exceeds their body's ability to tolerate the workload and taking inadequate time to recover from their workouts (Grier et al., 2022; Tung et al., 2024). Many studies have been done from an epidemiological standpoint, reporting the amount of gym members diagnosed with injuries; the injuries have been found to mostly involve their shoulders, knees, or lower backs (Alrushud, 2024; Islam et al., 2024; Bukhary et al., 2023). Generally speaking, individuals who are engaging in resistance training when supervised appropriately should not be believed to be at any real danger; however, because of the perception of danger associated with injuries, many individuals may decide not to participate, or they may regulate their training intensity. Therefore, individual perceptions of their injuries are potentially a limiting factor with respect to behaviors associated with exercise; therefore, perceived physical injuries are potentially a moderating factor hindering exercise behaviors.

Behavioral and psychological risks

Along with the associated physical risks of bodybuilding participation, there are concerns surrounding psychological and behavioral aspects of participation. Studies have indicated that individuals who participate in bodybuilding exhibit higher degrees of body image dissatisfaction and body image distortion than other students who may be less



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likely to participate in an appearance-focused environment (Jiménez-Limas et al., 2022; Wang et al., 2023). Some negative outcomes of bodybuilding participation include a compulsive exercise behavior and/or addiction, which adversely affect mental health (Godoy-Izquierdo et al., 2021). Additionally, men who have a strong desire to develop larger and more defined muscles, which is consistent with a desire for larger and better-defined breasts, also tend to experience a high degree of both muscle dysmorphia and psychological distress (Terhoeven et al., 2023). The identified psychological risks exist alongside the perceived benefits of bodybuilding, thereby creating a complicated and sometimes opposing set of motivational forces that could influence a participant's decision to participate. Thus, it is important to consider both the positive and negative perceptions of bodybuilding together.

The risk of using performance -enhancing drugs

The use of performance enhancing drugs is another risk factor in Bodybuilding. Research with US college students has shown that the level of awareness, attitude, and usage of these substances varies greatly (Constantinou & Aguiyi, 2022; Badr el Dine & Attia, 2022). Some people may feel pressured to get quick results and will turn to the use and/or consideration of performance enhancing substances; this creates large amounts of health and ethical concerns. The addition of substances creates more choices to make, making the choice to participate in Bodybuilding more difficult; therefore, understanding how individuals evaluate potential benefits versus potential risks is critical. The research currently available shows that there are both positive and negative effects associated with participating in bodybuilding, and research has been done on these positive and negative impacts of participation (physical and mental benefits vs. injuries, pressure etc.) separately; however, few researchers have examined how both negative and positive impacts can affect one's decision to participate. Therefore, they only look at either the motivation to participate or the barriers to participation in bodybuilding independently. Without the fragmentation of these different positive and negative factors, researchers cannot gain an overall view of exercise behavior. This may be particularly true for college students (caused by the need for them to deal with the positive and negative aspects of bodybuilding at the same time). This study is designed to assess the dual-valence framework for bodybuilding participation and examine how both perceived benefit and

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perceived risk are present concurrently and interactively affecting a person's participation in bodybuilding. The dual-valence framework will bring together facilitating and inhibiting factors relating to bodybuilding participation within one model to help understand exercise behavior holistically and provide further information to encourage safe and sustainable bodybuilding practices amongst college students.

Theoretical and conceptual foundation

Current study employed both behavioral theories as well as psychosocial models of behavior, in order to explain why people, choose to participate in exercise programs. These frameworks indicate that many people's decisions to take part in an exercise program are not based on just objective outcomes but also based on his/her own assessment of the outcome(s) of participating. Thus, a person's decision to participate in some form of activity will depend on how he/she views potential benefits and potential costs associated with his/her participation (Andre et al., 2023; An et al., 2023). The behavioral models identified three primary components that determine whether or not a person participates in an exercise program, including (1) expectations of the outcome(s), (2) perceived barriers to participating and (3) self-regulation. Positive evaluations of exercise were expected to motivate individuals through the perceived physical/psychological benefits, thereby increasing commitment and adherence to the program; conversely, negative evaluation of exercise were expected to deter or otherwise moderate the level of intensity, frequency and consistency of participation. The empirical literature evaluated established the significance of a variety of cognitive and emotional factors ie., self-efficacy, emotional intelligence, and exercise commitment that enable the transition from a subjective evaluation to an actual exercise behavior (An et al., 2023; Zhang, Lin et al., 2022). Drawing on the psychosocial and behavioral approaches, this study employed a dual-valence perspective, which suggested that multiple evaluations impacted exercise behavior. Thus, when making evaluations of the benefits of bodybuilding regarding physical outcome(s), health outcome(s) and confidence outcome(s), individuals consider the potential risks of participating in bodybuilding due to risk of injury, overtraining and emotional reasons. With this explanatory model, perceived benefits and perceived risks are treated as separate (exogenous) variables that impact the dependent (endogenous) variable (i.e., participation in bodybuilding). Exercise

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participation was viewed as a multidimensional construct; including frequency of participation, duration of participation, intensity of participation, level of commitment to participating in bodybuilding and level of engagement in bodybuilding-related activity. Perceived benefits were viewed as having a positive relationship to participation, while risk perception was viewed as a negative or moderate effect on participation. However, risk perception was not thought to be a true barrier to participation; rather, it served as a guide to the regulation of training behavior.

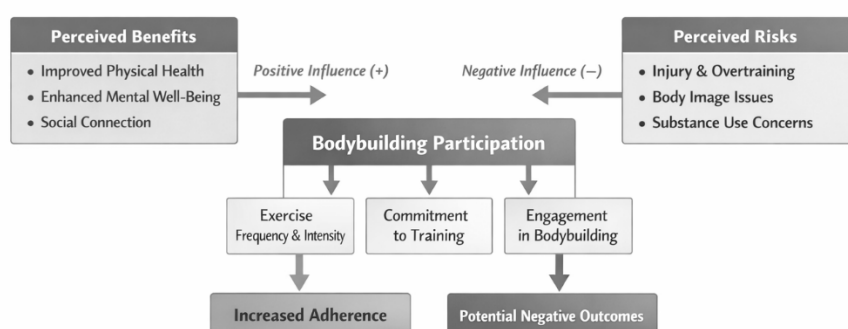


Figure 1. Dual Valence Structural Method of Bodybuilding Among College Student

By integrating positive (+) and negative (-) evaluations of bodybuilding into one theoretical model framework, this study produced a more global and comprehensive theory of the exercise behavior of college students. Furthermore, the conceptual model advanced the literature by addressing the shortcomings of previous studies by including the interplay between the benefits and risks of bodybuilding. Doing so provided a more complete understanding of how an individual makes a sound decision regarding his/her willingness to participate in bodybuilding.

Research objectives and hypotheses

The main purpose of this research was to analyze the influence that perceived advantages and the perceived disadvantages have on athletic activity amongst university students who take part in body building by utilizing a dual- valence model. Specifically, this work features an investigation of the degree of perceived advantages to be gained from body building that will include dimensions of perceived advantages (i.e., physical, psychological, and social advantages) and to also examine the degree of physical, psychological and behavioral risk connected from body building. This research also endeavors to evaluate the extent of behaviorally active body builders' participation (i.e.,

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frequency, duration, intensity and/or degree of commitment and/or degree of engagement) and to explore the relationship between both perceived advantages, perceived disadvantages and behaviors associated with body building among university students. Accordingly, the following hypotheses were tested:

H1: Perceived benefits had significant positive effect for the bodybuilding participation of college students.

H2: Perceived risks had a significant negative impact on participation in bodybuilding in college students.

Methods

Research design

This research utilized a quantitative, cross-sectional explanatory research design to investigate how perceived benefits and perceived risks impact students' participation in bodybuilding at the university. A cross-sectional design enabled the researcher to assess student perceptions regarding their behaviorally engaged in bodybuilding at one point in time along with a proposed relationship between perceived benefits and perceived risks as opposed to determining a cause-and-effect relationship between these variables over time. Cross sectional research designs are commonly used when researching how to improve or maintain healthy exercise behavior (Gjestvang et al., 2021; Andre et al., 2024). The study employed an explanatory framework that included both behavioral and psychosocial elements. Therefore, both perceived benefit and perceived risk are the explanatory elements in the study that were used to modify bodybuilding participation in the research. This study is consistent with previous literature and states that people's appraisals of the positive consequences and the barriers of participating in exercise influence their exercise participation behavior (Andre et al., 2024). In the research, bodybuilding participation was established based on exercise behavior definitions in previous literature (Zhang et al., 2022) using exercise frequency, exercise commitment, and exercise engagement as the characteristics in the study.

Research participants

The study participants were college students who perform body building or resistance training at various accredited colleges and universities located throughout

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Metro Manila, Philippines. The frequency of participation made the data collection process relevant as there are a number of higher educational institutes throughout the metropolitan and there are also many fitness gyms and facilities located close to the higher education institutes as well as there are multiple structured exercise programs located within the metropolitan area along with the number of individuals who participate in bodybuilding in a collegiate environment. With the aforementioned points being made, the context provided an ample amount of data for investigating participation in bodybuilding by high school and college students. The participants for this research study were selected from undergraduate student academic period 2024-2025 who were currently participating either recreationally or through an active offer to do bodybuilding or resistance training exercises. In an attempt to include only the participants who met the inclusion criteria, a non-probability, purposive sampling approach was employed. Participants were eligible for inclusion as part of the study if (a) they were a college student and (b) they participated in a bodybuilding or resistance training activity either recreationally or on a regular basis. The purposive sampling method was an appropriate sampling technique for the study because the study was conducted on a targeted population of students with specific knowledge and experience of bodybuilding, which allowed me to have relevant and meaningful data to achieve the objectives of the study. The final sample consisted of college students from many different universities located in Metro Manila who completed the survey voluntarily. The size of the sample provides adequate quantitative data to conduct analysis and to provide insight into the relationships between the perceived benefits versus the perceived risks of participation in bodybuilding. Subjects fit into the various age groups, both sexes, and year-in-school classifications and represent a diverse sample of college students participating in bodybuilding. The distribution of the ages of the subjects is similar to the typical age of college students; and distribution of the year-in-school classifications of the respondents indicates that the students belong to different levels within their academic programs. The sample distribution supports the possibility that the results of this study apply to the general population of college students in Metro Manila.



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Table 1. The Distribution of Respondent Profile

Profile	Frequency	Percentage
Age		
18-20	23	46.0 %
21-23	20	40.0 %
24-26	7	14.0 %
Total	50	100.0%
Sex		
Male	13	26.0 %
Female	37	74.0 %
Total	50	100.0%
Year Level		
Freshman	15	30.0 %
Sophomore	21	42.0 %
Junior	5	10.0 %
Senior	9	18.0 %
Total	50	100.0%

Data gathering procedure

Before collecting data, proper consent was confirmed from the appropriate college officials to do the study with college students. All steps were performed in accordance with established research ethics. Participation in the study was strictly voluntary, and potential participants were informed of the purpose, nature, and extent of the study. Before the research instrument was administered, all participants were asked to grant their consent and were assured that their answers would remain confidential and anonymous. Data were collected by administering a structured, self-administered questionnaire that measured each participant's perceived benefits of bodybuilding, perceived risks of bodybuilding, and degree of participation in bodybuilding. The questionnaire was administered to those eligible to participate in the study, specifically students actively engaged in bodybuilding or resistance training. To increase access to the instrument and the response rate, data collection occurred via both face-to-face and wire survey methods. Prior to completing the questionnaire, all participants were provided with clear directions on how to complete it correctly so that they could answer with consistency and reliability. Participants were encouraged to respond honestly and to reflect solely on their own personal experience and perception when responding to each question. The researchers remained available during the data collection period to assist respondents with any



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questions or clarification needed, thereby minimizing response bias and enhancing reliability. Data collection occurred at one time to maintain consistency in response and to reflect the participants' perceptions at one specific point in time, as is consistent with the cross-sectional design of the study. Once data collection was completed, all responses were reviewed for completeness and accuracy. The data have been systematically coded and organized for statistical analysis. All collected data were stored securely and used only for educational and research purposes. The systematic and ethically based methodology employed ensures that the integrity, reliability, and validity of the data used to assess the relationship between perceived benefits of bodybuilding, perceived risks of bodybuilding, and participation in bodybuilding by college students was maintained.

Data analysis

The data directory is structured, coded & analyzed to provide both descriptive & inferential statistical analysis to meet the study objectives. Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS) version 29 at a significance level of 0.05. Descriptive statistics (frequency, percentage, mean & standard deviation) were used to summarize the demographic profile (age, gender, & year level) & provide a summary of the degree of perceived benefits, perceived risk, & participation in Bodybuilding. Mean scores were also developed to determine overall response tendencies of respondents' perceptions & participation levels with the standard deviation being used to determine the variability & consistency of responses. The reliability of the research instrument was established through Cronbach's alpha coefficients calculated for each construct resulting in a range of 0.82-0.91 which was indicative of acceptable to high internal consistency which supports the validity of the questionnaire used to measure perceived benefits, perceived risk, & participation constructs. Inferential statistical analysis was conducted using Pearson product moment correlation (r) to examine the magnitude & direction of the relationships among perceived benefit, perceived risk, & Bodybuilding participation. Results were interpreted based on the two separate aspects of magnitude through correlation coefficient & statistical significance p-values. A positive correlation was identified between greater perceptions of benefits & greater participation, while a negative correlation was found to exist between greater perceived risk & lower participation. Where appropriate, an additional non-parametric test was conducted to



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examine differences between the demographic groups as a result of the ordinal nature of the data. Results were provided in tabular form and were used for interpretation in relation to the study objectives & hypotheses to provide a clear, evidence-based depiction of the relationships of variables.

Results

The perceived benefits of bodybuilding

The perceptions of bodybuilders regarding the advantages of bodybuilding are classified according to the physical, mental and social dimensions in the evaluation of these perceived benefits. The results indicated that the evaluations of the benefits indicated all categories had very high evaluations by respondents to the benefit of bodybuilding. The results further indicated that the physical benefits had a higher evaluation than the mental and social benefits respectively. As such, the results suggest that respondents commonly associate bodybuilding with physical health improvements; psychological well-being; and social interaction. Since variance across participants was relatively low, this indicates that participants agreed with the findings. Additionally, these results agree with other recent studies (An et al., 2024; Currier et al., 2023) that suggest the benefit perceptions are strongly related to motivations for participating in exercise and adhering to an exercise plan.

Table 2. Level of perceived benefits of bodybuilding

Benefits Dimension	Mean (M)	SD	Verbal Interpretation
Physical Benefits	3.70	0.52	Very High
Mental Benefits	3.45	0.60	Very High
Social Benefits	3.37	0.61	Very High
Overall Perceived Benefits	3.51	0.38	Very High

Note: 3.25–4.00 = *Very High*; 2.50–3.24 = *High*; 1.75–2.49 = *Low*; 1.00–1.74 = *Very Low*.

The perceived risk of bodybuilding

Respondents are aware of possible negative effects of body building on themselves such as physical, psychological and social risks. Therefore, respondents exhibited a high degree of perceived risk (rating) particularly in relation to physical risk, with physical risk rated 4.00 (very high). The table below shows the level of perceived risk associated with body building. From these results, it can be inferred that respondents to the survey were very aware of the potential risks associated with body building;



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primarily injuries and over-training. However, the fact that respondents were aware of both high perceived risks and high perceived benefits would suggest that the existence of a high level of perceived risk does not deter individuals from participating in body building. This finding is consistent with previous studies indicating that people are often willing to accept potential risks in order to achieve perceived benefits associated with participation (Andre et al., 2024; Grier et al., 2022).

Table 3. The level of perceived risk of bodybuilding

Risk Dimension	Mean (M)	SD	Verbal Interpretation
Physical Risk	4.00	0.48	Very High
Psychological Risk	3.38	0.70	Very High
Social Risk	3.34	0.75	Very High
Overall Perceived Risks	3.57	0.48	Very High

Note: 3.25–4.00 = *Very High*; 2.50–3.24 = *High*; 1.75–2.49 = *Low*; 1.00–1.74 = *Very Low*.

The bodybuilding participation

The level of bodybuilders' participation in bodybuilding was measured using 5 indicators: frequency, duration, intensity, commitment, and involvement. The results suggest that respondents exhibit an overall high level of participation in bodybuilding, with the greatest mean score for duration. These findings imply that respondents actively participate in bodybuilding through sustained involvement, primarily related to the amount of time they commit to their participation in bodybuilding; however, it is interesting to note that the mean for respondents' intensity was quite low. This suggests that individuals may engage in self-regulatory behaviors when deciding what level of intensity to use while exercising, perhaps due to being aware of the potential risks associated with exercising. The behavior shown here is consistent with the principles associated with self-regulation in exercise participation since individuals adjust the level of physical activity, they perform based on their perceived level of risk versus benefit associated with exercising (Andre et al., 2024).



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Table 4. The level of Bodybuilding participation

Dimension	Mean (M)	SD	Verbal Interpretation
Frequency	3.20	0.61	High
Duration	3.26	0.67	Very High
Intensity	2.52	0.64	High
Commitment	3.05	0.69	High
Engagement	3.13	0.74	High
Overall Participation	3.03	0.47	High

Note: 3.25–4.00 = *Very High*; 2.50–3.24 = *High*; 1.75–2.49 = *Low*; 1.00–1.74 = *Very Low*.

Relationship between perceived benefits, perceived risks, and participation

Pearson product-moment correlation analysis was used to explore the relationships between different variables. Table 5 illustrates the correlation coefficients, statistical significance levels and related interpretations for the relationship between perceived benefits and perceived risks as related to bodybuilding participation. Moderately strong positive relationship (significant) between perceived benefits and participation ($r=0.694$, $p < 0.01$) would imply that participants who perceive bodybuilding as providing high levels of benefit will likely participate in bodybuilding at a greater level than those who perceive a low level of benefit. This finding supports previous research that indicates that individuals with positive outcome expectations are much more likely to be committed to exercising and adhere to an exercise program (An et al., 2024; Zhang et al., 2022). Weak negative and nonsignificant relationship between perceived risk and participation ($r=-0.21$, $p > 0.05$) would suggest that even though participants are cognizant of potential risks, they do not significantly impact their level of participation. In agreement with previous research (Andre et al., 2024; Bonilla et al., 2022) that suggests that perceived risk tends to serve as a moderator rather than a barrier to exercise participation and thus the weak negative and nonsignificant relationship between perceived risk and participation would make sense.

Table 5. Relationship Between Perceived Benefits, Perceived Risks, and Bodybuilding Participation

Variables	Correlation (r)	p-value	Interpretation
Perceived Benefits and Participation	0.694	$p < 0.01$	Moderately Strong Positive (Significant)
Perceived Risks and Participation	-0.21	$p > 0.05$	Weak Negative (Not Significant)

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Note: Correlation strength is interpreted as follows: 0.00–0.19 = Very Weak; 0.20–0.39 = Weak; 0.40–0.59 = Moderate; 0.60–0.79 = Strong; 0.80–1.00 = Very Strong.

Indicates statistical significance ($p < 0.05$, ** $p < 0.01$).*

Discussion

The current research investigated the contributions of perceived benefit and perceived risk to bodybuilding participation among college students by using a dual-valence framework. The findings show that there were very high levels of both perceived benefits and perceived risks for respondents who participated in bodybuilding; however, participation remained quite high overall. Interestingly, there was a statistically significant positive relationship between the level of perceived benefit and level of participation; whereas there appeared to be a statistically insignificant or weak negative relationship between perceived risk and level of participation. Therefore, the findings provide insight into college students' evaluation of exercise behavior and the validity of the dual valence model.

Perceived benefits as a determinant of participation

Results show that participants felt that there were considerable perceived physical, psychological and social benefits from participating in a bodybuilding program. Further, the results of the study support that the perceived benefits of bodybuilding are a main contributor to the level of participation in bodybuilding for college students as evidenced by the moderately strong and statistically significant positive relationship between perceived benefits and participation for the participants. The findings are consistent with the premise of behavioral (exercise) theories that positive outcome expectancies serve as a key motivator for continued participation and adherence to exercise (An et al., 2024; Andre et al., 2024). Additionally, previous research supports the findings that those who perceive a greater benefit from exercise are more likely to continue regular physical activity (Zhang, Lin et al., 2022). In regard, the findings demonstrate that perceived benefits are an influential factor in exercise behavior. Practically, this illustrates the importance of conveying the positive benefits of bodybuilding (i.e. improved health, increased confidence, well-being) to enhance participation rates among college students.



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Studying the role of perceived risks in exercise behavior

Perceived risks were indicated to have similarly high value as perceived benefits, with patients indicating that their most significant perceived risk was physical risk (i.e. injury or overtraining). This implies that the respondents demonstrated an awareness of the potentially negative consequences of body building. However, there was a relatively high level of participation among the respondents in body building and the correlation between perceived risks and participation in body building was weak and not statistically significant. This is an important finding as it contradicts the traditional assumption that participants drop out from exercise due to their perception of risk. Instead, the results indicate that perceived risks do not represent a primary barrier but could instead be regulating exercise behavior (i.e. respondents appear to acknowledge the risk but nevertheless do not allow the risk to dissuade them significantly from body building). This finding is consistent with previous research that shows that individuals will continue to participate in physical activity even when they are aware of the risks associated with that activity, if the perceived benefits of physical activity exceed the negative outcomes associated with those risks (Bonilla et al., 2022; Andre et al., 2024). In accordance with the dual-valence framework, this finding illustrates that the regulation of exercise behavior is influenced by the relative balance of positive and negative evaluative consequences rather than the avoidance of risks alone. Thus, as perceived risks did not have a significant negative impact on participation. Additionally, the relatively low negative impact of perceived risk on body building participation suggests that perceived risk may have an influence on how the participants manage their training (by altering the amount of time spent on body building (i.e. increasing/decreasing frequency and/or intensity), rather than whether the individuals choose to engage in body building).

Benefits and risks exist at the same time (dual-valence approach)

In this study, we have shown that individuals perceive benefits and risks at the same time, resulting in many individuals engaging or participating in an activity regardless of its potentially hazardous nature. Thus, through this study, there is empirical support for the dual-valence paradigm to explain how individuals weigh both positive and negative factors of an activity before deciding to participate. From these findings, it appears that college students do not see the potential benefits as being exclusionary from



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the potential risks; rather, individuals will weigh the positive and negative factors equally when making decisions regarding participation. Although benefits provide an excellent amount of motivation for an individual to engage in an activity, risks appear to provide the individual with guidelines for how to self-regulate (e.g., how to moderate intensity; which types of training practices to use) when they are performing a given activity. This supports the notion that one of the major mechanisms used to promote participation in an activity is through the use of cognitive evaluation and self-regulation, as evidenced in other models of exercise behavior (Andre et al., 2024; An et al., 2024). Moreover, the results of this study provide an explanation for why individuals maintain participation, even in the face of risk. Therefore, the desire to participate in an activity outweighs the associated risks when individuals are able to manage the associated risk. Finally, therefore, when designing a program to promote participation in activities, there is clearly a need to promote the benefits of the activity as well as provide individuals with the knowledge and skills to avoid potential negative events.

Integration with prior literature

The present study adds to prior literature by integrating various theoretical perspectives on exercise behavior. While prior research has often examined either the positive or negative aspects of resistance training alone, the present study shows that in order to fully understand how often a person chooses to participate in resistance training, both perceived positive and negative aspects must be considered. The current study's findings regarding the importance of perceived benefits are consistent with previous literature suggesting that perceptions of motivation are important predictors of exercise adherence (An et al., 2024; Zhang, Lin et al., 2022). Conversely, the present study's finding that perceived risks do not have a significant effect on college bodybuilders' adherence to resistance training is consistent with previous research demonstrating that risk perception functions as a moderator rather than a barrier to engagement (Bonilla et al., 2022). By integrating these perspectives, the current study provides a more thorough analysis of perceptions of resistance training and their effects on college student bodybuilder participation in resistance training.



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Practical implications

Results from this investigation offer valuable information for health promotion and fitness programs geared toward college-aged individuals. First, researchers should develop interventions to target the wider array of benefits that accompany bodybuilding, ranging from physical to psychological and social, to help increase participants' motivation and level of engagement. Second, because not all risks will deter individuals from participating in an activity, but may alter the manner in which they participate, more emphasis needs to be placed on how to effectively manage risks of engaging in bodybuilding. Specifically, proper training techniques, learning how to prevent injuries, having adequate recovery periods, and being conscious of one's psychological well-being are all important aspects to include within risk management strategies. These measures will encourage safe and sustainable participation in bodybuilding. Lastly, the dual-valence framework provides guidance for developing interventions to ensure the greatest possible benefits and the least possible risks, which can lead to long-term adherence to physical activity.

Conclusion

This research investigated the relationship of perceived advantages and risks concerning bodybuilding participation in collegiate students with a dual-valent approach. The results demonstrated that respondents perceived both advantages and disadvantages of bodybuilding at very high levels, but that overall participation levels were high. That perceived advantages have a large positive effect on bodybuilding participation while perceived disadvantages have a very low or no effect suggests that bodybuilding participation by college students is most positively impacted by expected positive outcomes and not by avoidance of the expectation of negative outcomes. The results confirm the positive impact of perceived advantages as a key factor in sustained bodybuilding participation. The low or no effect of perceived disadvantages and their lack of impact as a major limiting factor in bodybuilding participation. Perceived disadvantages may therefore serve more as a controlling factor on how students engage in bodybuilding, and not whether they engage in bodybuilding. As a limitation, the study includes the use of a cross-sectional design, reliance upon self-reported data, and the use of a relatively small sample size. It is suggested that future studies utilize cross-sectional



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designs and larger, more diverse sample sizes to provide greater generalizability and verification of study results. Use of qualitative research by examining various controlling factors including supervision of fitness routines, history of participation, and use of professional instruction have the potential to enhance further the understanding of exercise participation behaviors. Bodybuilding participation among collegiate students is primarily driven by perceived advantages while perceived disadvantages do not affect participation itself, rather, perceived disadvantages affect the regulation of participatory behaviors. The results point to the importance of providing a balanced exercise behavior to the collegiate population that maximizes the advantages and effectively manages the disadvantages.

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