

From Ephedra to creatine: using theory to respond to dietary supplement use in young athletes

By: Jennah R. Dodge, M. Allison Ford, [Michael A. Perko](#)

Dodge, J., Ford, M. A., & Perko, M. A. (2003). From Ephedra to Creatine: Using Theory to Respond to Dietary Supplement Use in Young Athletes. *American Journal of Health Studies*, 17(3)98-104.

Made available courtesy of American Journal of Health Studies: <http://www.va-ajhs.com/>

*****Reprinted with permission. No further reproduction is authorized without written permission from the American Journal of Health Studies. This version of the document is not the version of record. Figures and/or pictures may be missing from this format of the document.*****

Abstract:

Sport dietary supplements have garnered national media attention in their popularity with young athletes. Research shows the vast majority of claims made for these products are unproven, and health risk increases with use. There is an increasing need to understand why these athletes are considering using these products. Two theories, the Theory of Reasoned Action, and The Theory of Planned Behavior are often applied to help predict behavior, and contain elements that may help health educators examine sport dietary supplement use and develop appropriate interventions by incorporating each theories constructs into one behavioral model. The purpose of this manuscript is to explore the application of the Theory of Reasoned Action and Theory of Planned Behavior to sport dietary supplement use to better understand the influences in young athletes.

Article:

For the past few years the sports world has seen a flurry of interest in dietary supplements, from Ephedra scares to baseball players bulking up. In 1998, many consumers and sports fans raised their eyebrows after reading the headline "Mark McGwire cites Andro use in Breaking Homerun Record". In a few short years, the use of Andro (Androstendione) and other sport dietary supplement products has become so commonplace that few are even blinking with these more recent headlines:

- "Since 1995, Dietary Supplement Companies have contributed 10.9 Million Dollars to Congressional and Presidential Campaigns." (US News and World Report, February 12, 2001, p. 49)
- "Continental Basketball Association inks Deal to Promote Nutritional Supplements." (www.cbahoopsonline.com., January 2003)
- "NHL Coaches Polled: 100% agree; No Steroids in Hockey ..." (SI, Jan. 20, 2003, p. 61)

Unfortunately, it seems only a player's death causes any real debate about the issue. Legal and easily obtainable, sport dietary supplements fall under the guidelines established by the 1994 US Congress when they passed the Dietary Supplement Health and Education Act (DSHEA). The DSHEA effectively states that dietary supplement products cannot be removed from the marketplace unless they are proven to be a health hazard. Furthermore, no pre-market clearance to test the product is required by law before a product can be placed on the shelves of local stores. According to Dr. Gary Wadler, a physician and author of the book *Drugs and the Athlete*, "The law still requires that if you want to know if dietary supplements are safe or not, you as the consumer have to analyze it--not the government, and not the supplement companies." (NY Daily News, Sunday, July 15, 2001).

Recent national surveys tell us that young athletes are a primary market for these unregulated sports dietary supplements (Blue Cross/Blue Shield; NCAA). With over 6.6 million young athletes participating in some form of supervised sport (National Federation of State High Schools Association) and many more continuing activity

in college, increased diligence in awareness and education in this arena is certainly warranted. One traditional scholarly approach to the issue of sport dietary supplement use among young athletes has been administering surveys to the athletes requesting information on usage rates, reasons for use, and products used. While this has provided researchers with substantial background data, it has not provided the rich behavioral data needed to initiate outcome-based interventions. As early as 1992, researchers in the field were calling for social-science theory to be applied to sport dietary supplement research to better understand the complexities of use, and decisions to use/not use supplements (Sobal & Marguaret, 1994). The purpose of this paper is to provide evidence for this call to action and suggest appropriate behavioral theories.

LITERATURE REVIEW

Dietary supplement use is a well-documented practice among adult and adolescent athletes (Sobal & Marquart, 1994). Reasons for consuming dietary supplements are likely to be complex by combining social, psychological, and economic factors (Conner, Kirk, Cade, & Barrett, 2001). While current nutrition literature states that the vast majority of sport dietary supplements do little to enhance performance, they are still commonly sought out (Burke, L., Desbrow, B., & Minehan, M., 2000). Adolescent athletes' supplement use is higher than the national average of supplement use for all adolescents (Sobal & Marquart, 1994). The American Dietetic Association's (ADA) statement on vitamin and mineral supplementation stresses the intake of a wide variety of foods is preferred over nutrient supplementation as a method of obtaining adequate vitamins and minerals (American Dietetic Association (ADA), 1994). Medical evidence suggests that only certain subgroups of people need dietary supplements, for example, increased iron is needed for pregnant women, special formulas for infants and small children, folate for women of child bearing years, and calcium for adolescent girls and young women (ADA Position Statement, 1994; revisited without change, 1998).

It is unclear what influences exist with regard to dietary supplements. Supplements claim to increase energy, improve performance, and increase muscular strength appeal to the adolescent athletic population (Grunwald & Bailey, 1993; Philen, Ortiz, Auerbach, & Falk, 1992). Such claims maybe especially influential to adolescents striving to improve their performance (Perko et al., 1999). Fleischer and Read (1982) found that boys participating in sports take supplements more than those who do not participate in sports; this in turn suggests that the participation in sports may be a motivation for supplement use.

It is difficult for health educators/promoters to try and alter or change the supplement use behavior with intervention measures if the influences of use are unclear. There has been great concern regarding risks of dietary supplement use among adolescent athletes. Little is actually known about the initiation process of the use of the supplements, or the attitudes that the adolescents hold toward them. Among athletes, adolescents are often targeted by the dietary supplement industry (Coward, 1992; Friedl et al., 1992; Lightsey & Attaway, 1992; Pearl, 1991). Increased energy claims, ability to improve performance, and gains in muscular strength seem to appeal to the adolescent population (Grunwald & Bailey, 1993; Philen et al., 1992). However, time and again these claims are not supported in literature (Perko, 1999).

Sports dietary supplements are not subject to FDA testing, therefore the safety profiles of these products are often unknown (Metzl, Small, Levine, & Gershel, 2001). Labeling standards have been established and as long as there are no claims with reference to the benefits of dietary supplements to cure disease or prevent illness on the label, supplements are legal through government standards. The American College of Sports Medicine (ACSM) discourages Creatine use in people younger than 18 years old because of unknown potential adverse health effects (Metzel, et al., 2001). The lack of regulated testing standards has resulted in ingredients such as ecdysterone, an insect hormone with no known use in humans; levodopa, a prescription medication; and animal glandular material being found in dietary supplements (Philen et al., 1992).

THE THEORY OF REASONED ACTION

The TRA was introduced by Martin Fishbein in 1967 (Fishbein, 1967), and later with Icek Ajzen to further develop, revise, and refine this promising social psychological theory. As a result of this collaborative work,

several books have been published detailing the development of TRA instruments, applications, methodology, and evaluation (Ajzen, 1988; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

The ultimate goal of the TRA is to predict and understand human behavior. In the case of this investigation, the behavior under study is use of dietary supplements by adolescent athletes. For a behavior such as adolescent athletes' use of dietary supplements to be adequately explained by the TRA, two basic assumptions must be met. First, it should be assumed that humans are rational beings who possess the ability to use information available to them to arrive at a behavioral decision in a reasonable manner. The TRA also assumes that the behavior of interest is under the volitional control of the individual. In other words, the individual has the ability to easily perform or to refrain from performing the behavior if they are so inclined. Ajzen and Fishbein also recognized that many behaviors (e.g., smoking cessation) have incomplete volitional control. They concluded that, for these behaviors, the TRA is not appropriate in predicting or understanding that behavior.

THEORETICAL CONSTRUCTS OF THE TRA

The TRA holds that the immediate determinant of a person's behavior is that person's intention to perform or not to perform that specific behavior. Generally speaking, individuals will adopt the behavior associated with their strongest intention. Ajzen and Fishbein (1980) identified these determinants as attitude toward the behavior, which is a personal factor, and subjective norm, a factor reflective of social influence. Attitude toward the behavior is defined as a person's positive or negative evaluation of personal performance of the behavior. Subjective norm is described as an interaction between a person's perception of how significant others in his/her social environment feel about the individual's performance of the behavior and the person's motivation to comply with these significant others. For most behaviors under volitional control, both of these factors are strong predictors of behavioral intention. A summary of TRA research studies presented by Ajzen (1988) shows that the influence of attitude toward the behavior and subjective norm varies across behaviors and populations with correlations ranging from 0.40 and 0.73. For most behaviors, the influence of the attitudinal component outweighs that of the subjective component. Thus, based on TRA research, it is safe to assume that most individuals will intend to perform a behavior when they evaluate its consequences positively and they believe that significant others think they should perform the behavior.

Since its inception, the TRA has been successfully applied in explaining and predicting a variety of behaviors, such as voting choice in a presidential election (Fishbein, Ajzen, & Hinkle, 1980), contraception use (Fishbein, Jaccard, Davidson, Ajzen, & Loken, 1980), seat belt use (Wittenbacker, Gibbs, & Kahle, 1983), drug use (Budd, Bleiker, & Spencer, 1983), mother's infant feeding behavior (Manstead, Proffitt, & Smart, 1983), alcohol use by young adults (O'Callaghan, Chant, Callan, & Baglioni, 1997), and smoking behaviors (McGahee, Kemp, & Tingen, 2000).

This theory-based model is well suited to young athletes dietary supplement use and use behaviors. The TRA's constructs can help to understand the attitudes toward the behavior (supplement use) and, the subjective norms (how the students feel they need to comply with their surroundings or environment to feel accepted), and the behavioral intentions of the adolescent athletes with regard to dietary supplement use. Knowing the ideas about dietary supplements with regard to each component of the model helps to better understand the prevalence and influences of supplement use. A TRA based survey was used for assessing influences of dietary supplement use among adolescent athletes by Perko et al., in 2000. The study identified influences of supplement use or nonuse for 1737 student athletes' ages 14-19 years old. Survey questions addressed the three components of the TRA. Survey results exhibited a relationship with the athletes' intention of use or nonuse of supplements and their attitude toward the behavior and their subjective norms. The study indicated that coaches, parents, athletic trainers, physicians, teammates were all recognized as influences of supplement use and nonuse in adolescent athletes.

APPLICATION OF THE THEORY OF REASONED ACTION

ATTITUDE

The first component of the TRA is attitude of dietary supplements. This corresponds with a positive or negative evaluation of personal performance of the behavior choice, a gut feeling of whether or not the behavior is a good or bad choice. Do they (adolescent athlete) feel it is a good or bad choice to use supplements? The health educator needs to focus on the opinions about the benefits of supplement use, and the need to use them to improve performance. Discovering whether the adolescents feel that supplements are safe is important. Health educators know the possible negative effects or lack of benefits of dietary supplements used for performance enhancement. The real question is do these young adults know the facts?

SUBJECTIVE NORMS

The second component of the TRA is the subjective norms. This is described as the interaction between a perception of how significant others in his/her environment feel about the performance of the behavior and the motivation they feel that they need to comply with the significant others. Examples of significant others could be; coaches, parents, physicians, athletic trainers, teammates, and friends. These examples will help to identify the athletes' perception of how significant others will feel about their supplement use. Health educators should examine how the athlete feels significant others will respond to their use of supplements, the opinion of the significant others, and the amount of support the adolescents want to have from them. This component also enables health educators in identifying subjective norms for this adolescent population.

BEHAVIORAL INTENTION

The third and final component of this model is the behavioral intentions. This component is the most immediate in determining a person's behavior because the intention to perform or not perform the behavior in general indicates the choice the individual makes. In general, the person will participate in a behavior that is associated with their strongest intention. This intention is the direct result of the attitude and subjective norms. Health educators should focus questions in this component to directly assess the intention one has to perform the behavior. Sample questions might include: Do they have ideas about when they will begin to use supplements, or how they will attain the supplement? How would the adolescent react if a teammate or coach gave a supplement to them? Do they feel that they will comply to a behavior because the rest of the team is doing so?

Glanz et al., (1997) reported that the TRA components might not be sufficient for predicting behaviors in which volitional control is reduced. A person who has a high motivation to perform the behavior may not actually perform the behavior due to intervening environmental conditions. Environmental conditions may have an impact on the use of supplements. Access and economic factors may interrupt actually attaining supplements. Addressing that concern specifically is the extension to the original TRA model, with the Theory of Planned Behavior (TPB).

APPLICATION OF THE THEORY OF PLANNED BEHAVIOR

PERCEIVED BEHAVIORAL CONTROL

The Theory of Planned Behavior (TPB) added the construct of perceived behavioral control to the TRA. This was to help accommodate the factors that are outside the individuals' control that may in turn affect his/her behavior and intention (Ajzen, 1985). The addition of this was based on the notion that a joint concept existed based on motivation (intention), and ability to perform the behavior (behavioral control). With regard to supplement use, health educators should address questions that pertain to how easily adolescents feel it is for them to take supplements, and if they feel that there are factors outside their control that may prevent their use.

PERCEIVED POWER

The second component of the TPB states that the perceived control is determined by control beliefs concerning the presence or absence of resources for behavioral performance and the perceived power or the impact that each resource may have to facilitate or inhibit the behavior (Ajzen, 1985). Health educators should address whom the significant others are and what, if any, effect they have on the athlete's decision to use supplements. Also, health educators should direct questions regarding the possible constraints that may occur for the athletes.

Constraints could be access to supplements, economic factors, their perception of their own control over the behavior, and discovering if the significant others are the means for attaining the supplement. See Table 1 to review key points for application of the model.

CONCLUSION

Through the TRA with the addition of the TPB, a more dynamic approach to assess the attitudes, beliefs, and behavioral intentions for dietary supplement use by adolescent athletes is created. A minimal amount of research exists assessing the influences of dietary supplement use. The TRA is an effective model for predicting and understanding supplement use. Through the TRA and the TPB means of assessment is created for understanding the behavioral ideas and intentions. Understanding the adolescent population can help health educators to perform intervention measures appropriate for the choices they are making. With intervention through education, these adolescent populations will learn the correct information through a reliable source.

Table 1. Key Points for Application

- Attitude: Focus on opinions, what the athletes feel about supplements. Are they safe?
- Subjective Norms: Direct the issue of how the adolescents feel that those in their environment will feel about their use of supplements, do the subjective norms support the behavior? Subjective norms examples: coaches, parents, teammates, and athletic trainers.
- Behavioral Intentions: Health educators need to assess the intention the athletes have to use dietary supplements. Would the athletes use supplements if their coach said it was okay?
- Perceived Behavioral Control: Attention should be directed to how easily the athletes feel that it is for them to take supplements. Are there outside factors that may prevent supplement use?
- Perceived Power: Directly focus on how the adolescents feel that their subjective norms have power over what they do. It is important to address the issue of economic factors and access to supplements.

REFERENCES

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Ajzen, I. (1988). *Attitudes, personality and behavior*. Milton Keynes, England: Open University Press.
- Ajzen, I., & Fishbein, M. (Eds.) (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- American Dietetic Association. (1994). Positions of the American Dietetic Association: Enrichment and fortification of foods and dietary supplements. *Journal of the American Dietetic Association*, 94, 661-663.
- Blue Cross/Blue Shield National Performance-enhancing Drug Study (2002). www.healthycompetition.org/
- Brubaker, W. H., & Loftin, T. L. (1987). Smokeless tobacco use by middle school males: A preliminary test of the reasoned action theory. *Journal of School Health*, 57, 245-249.
- Budd, R., Bleiker, S., & Spencer, C. (1983). Exploring the use and non-use of marijuana as reasoned actions: An application of Fishbein and Ajzen's methodology. *Drug and Alcohol Dependence*, 11, 217-224.
- Conner, M., Kirk, S., Cade, J., & Barrett, J. (2001). Why do women use dietary supplements? The use of the theory of planned behavior to explore beliefs about their use. *Social Science and Medicine*, 52, 621-633.
- Cowart, V. (1992). Dietary supplements: Alternatives to anabolic steroids? *The Physician and Sports Medicine*, 20(3), 189-198.
- Cyphers, L., & O'Keefe, M. (2001). NY, Daily News, New York, NY, Sports, Sunday, July 15, Pg. 80.
- Dunkley, T., Wertheim, E., & Paxton, S. (2001). Examination of a model of multiple sociocultural influences on adolescent girls' body dissatisfaction and dietary restraint. *Adolescence*, 36, 265-279.

- Fishbein, M. (1967). Readings in Attitude Theory and Measurement. In Glanz, K., Lewis, F., and Rimer, B., Health Behavior and Health Education: Theory, Research, and Practice. (85-86). San Francisco, CA: Jossey-Bass.
- Fishbein, M., & Ajzen, I. (1975). Belief Attitude, Intention and Behavior: An introduction to Theory and Research. In Glanz, K., Lewis, F., and Rimer, B., Health Behavior and Health Education: Theory, Research, and Practice. (85-86). San Francisco, CA: Jossey-Bass.
- Fishbein, M., Ajzen, I., & Hinkle, R. (1980). Predicting and understanding voting in American elections: Effects of external variables. In M. Fishbein & I. Ajzen (Eds.). Understanding attitudes and predicting social behavior, (pp. 174-195). Englewood Cliffs, NJ: Prentice-Hall.
- Fishbein, M., Jaccard, J. J., Davidson, A. B., Ajzen, I., & Loken, B. (1980). Predicting and understanding family planning behaviors: Beliefs, attitudes, and intentions. In M. Fishbein & I. Ajzen (Eds.). Understanding attitudes and predicting social behavior, (pp. 130-147). Englewood Cliffs, NJ: Prentice-Hall.
- Fleischer, B., & Read, M. (1982). Food supplement usage by adolescent males. International Journal of Sports Nutrition, 17, 831-845.
- Friedl, K., Moore, R. J., & Marchitelli, L. J. (1992). Steroid replacers: Let the buyer beware. National Strength and Conditioning Association Journal, 14(1), 14-19.
- Glanz, K., Lewis, F., & Rimer, B. (1997). Health Behavior and Health Education: Theory, Research, and Practice. San Francisco, CA: Jossey-Bass.
- Grunwald, K., & Bailey, R. (1993). Commercially marketed supplements for bodybuilding athletes. Sports Medicine, 15, 90-103.
- Haymes, E. M. (1991). Vitamin and mineral supplementation to athletes. International Journal of Sports Nutrition, 1, 146-69.
- Lightsey, D. M., & Attaway, J. R. (1992). Deceptive tactics used in marketing purported ergogenic aids. National Strength and Conditioning Journal, 14(2), 26-3.
- Manstead, A. R. S., Proffitt, C., & Smart, J. L. (1983). Predicting and understanding mothers' infant feeding intentions and behavior: Testing the theory of reasoned action. Journal of Personality and Social Psychology, 44(4), 657-671.
- McGahee, W., Kemp, V., & Tingen, M. (2000). A theoretical model for smoking prevention studies in preteen children. Pediatric Nursing, 26, 135-143.
- Metzl, J., Small, E., Levine, S., & Gershel, J. (2001). Creatine use among young athletes. Pediatrics, 108, 421-424.
- NCAA Study of Substance Use Habits of College Student-Athletes (June 2001). NCAA, P.O. Box 6222, Indianapolis, Indiana 46206. www.ncaa.org/library/research/substance_use_habits/2001/substance_use_habits.pdf
- National Federation of State High Schools Association, Po Box 690, Indianapolis, IN 46206. (2003). Participation sets record for third straight year. www.nfhs.org/press/participation_survey01.htm
- Norman, N. M., & Tedeschi, J. T. (1989). Self-presentation, reasoned action, and adolescents' decisions to smoke cigarettes. Journal of Applied Social Psychology, 19, 543-558.
- O'Callaghan, F., Chant, D., Callan, V., & Baglioni, C. (1997). Models of alcohol use by young adults: an examination of various attitude-behavior theories. Journal of Studies on Alcohol, 58, 502-506.
- Pearl, J. M. (1991). Severe reaction to "natural testosterone": How safe are the ergogenic aids? American Journal of Emergency Medicine, 11, 188-189.
- Perko, M. (1999). Development of a theory based instrument regarding adolescent athletes and dietary supplements. American Journal of Health Studies, 15, 71-86.
- Perko, M., Bartee, T., Dunn, M., Wang, M., & Eddy, J. (2000). Giving new meaning to the term "taking one for the team:" Influences on the use/nonuse of dietary supplements among adolescent athletes. American Journal of Health Studies, 16, 99-106.
- Philen, R., Ortiz, D., Auerbach, S., & Falk, H. (1992). Survey of advertising for nutritional supplements in health and body building magazines. Journal of American Medical Association, 268, 1008-1011.
- Sobal, J., & Marquart, L. F. (1994). Vitamin/mineral supplement use among athletes: A review of Literature. Journal of Sports Nutrition, 4, 320-334.
- Sports Illustrated, Jan. 20, 2003, p. 61

Stang, J., Story, M., Harnack, L., Neumark-Sztainer, D., & Mathieu, J. (2000)

Relationship between vitamin and mineral supplements use, dietary intake, and dietary adequacy among adolescents. *Journal of the American Dietetic Association*, 100, 905-910.

US News and World Report, February 12, 2001, p. 49.

Wittenbaker, J., Gibbs, B. L., & Kahle, L. R. (1983). Seat belt attitudes, habits, and behaviors: An adaptive amendment to the Fishbein model. *Journal of Applied Social Psychology*, 13, 406-421.

www.cbahoopsonline.com, January 2003