

# **Towards a more sophisticated understanding of disordered eating etiology as it relates to nutrition and weight monitoring tools in athletes**

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## **Key Points**

- Interaction between characteristics of monitoring tools and individual intent of usage may explain positive and negative associations between these tools and disordered eating.
- Modulating monitoring practices or tools outside of eating disorder treatment may draw attention away from underlying modifiable intrinsic factors that impact disordered eating risk – masking symptoms while failing to address root causes.
- A self-regulation based model as it relates to eating disorder etiology can be used to expand on current research and explore the potential positive or negative impact of certain weight and nutrition monitoring tools on disordered eating.
- Certain practices and tools may be more or less beneficial in support of goal outcomes and ordered eating. External monitoring tools with certain characteristics are likely to be beneficial in not only empowering athletes to achieve their goals, but also in reducing disordered eating and eating disorder risk in so doing.
- Tools that support ordered eating and reduce the risk of disordered eating likely encourage: flexible control in regard to food choices, easy understanding of accurate nutrition needs, consistent monitoring of nutrition needs and weight, consistent messages as they pertain to nutrition and weight goals for health and performance, clear measures of success, successful goal outcomes and self-efficacy, weight control, third-party monitoring and intervention, and dynamic capabilities to meet the fluctuating nutrition needs of the individual
- Development and research into the impacts on health, disordered eating, weight, and performance of a nutrition monitoring tool that encompasses all of the aforementioned beneficial attributes is warranted.
- Nutrition professionals may increase or decrease disordered eating in athletes based on how they select, educate on, and implement usage of monitoring tools.

## Introduction

It is common in practice and in social media for nutrition professionals who do not specialize in disordered eating (DE) or eating disorders (ED) to encourage avoidance of weight monitoring and certain nutrition intake monitoring practices because they believe those practices to be causative of eating pathologies. The body of existing research, albeit limited, as well as nutrition professionals who specialize in treating DE and ED support conclusions to the contrary: that these practices can support ordered eating or disordered eating and ED risk based on how they are understood and implemented, that these practices are likely not causative of eating pathology, and that these practices are crucial for health and success in sport. The discussion to follow will refer to DE with the assumption that ED are included on the DE spectrum.

## Self-Weighing, Calorie Tracking, & DE

Individuals implement a wide array of weight and nutrition monitoring practices consciously or otherwise. Common weight monitoring practices include self-weighing, third-party body composition analysis, self-perception of clothing fit, and self-perception of physical appearance. Common nutrition monitoring practices include calorie or macronutrient tracking, plate modeling, exchange-based tracking, mindfulness of hunger cues, and self-perception of food intake volume or energy content. Tools such as scales, mobile apps, and mental models may be employed in execution of these practices.

While research is relatively new and expanding into the topic, associations have been found between self-weighing and disordered eating symptomatology (1-6) as well as calorie or macronutrient tracking and disordered eating symptomatology (7-9). One study of ED clinic patients found that 58% of participants with ED symptoms who used a popular calorie and macronutrient tracking app perceived the app as at least moderately contributing to their symptoms (9). Yet, research has also found a lack of association (10-14) or an association only for certain at-risk groups such as females or non-obese subjects (1,4-6). Associations appear limited to observational, retrospective analyses, and exhibit greater strength when discounting users that do not show negative outcomes or when measuring these practices against DE severity. Interventional research has yet to find an association, whether correlative or causative. This would suggest that while it is unclear whether these tools and practices exacerbate or are merely a

manifestation of DE, it is unlikely that they are causative factors for ED or for movement along the DE spectrum. Some authors conclude that the interaction between characteristics of monitoring tools and individual intent of usage may explain associations, both positive and negative (7). Further research is warranted, especially in athletes where it is particularly limited.

It should also be noted that eating disorder treatment often involves manipulation of monitoring practices whereby tracking weight or energy intake may be discontinued or implemented during the treatment and recovery process (15) providing further support that these practices may not inherently impact DE, but that the impact whether positive or negative is modulated by environmental and individual intrinsic factors. In which case, modulating monitoring practices or tools outside of ED treatment may not impact DE, instead drawing attention away from modifiable intrinsic factors that do – masking symptoms while failing to address root causes.

## DE Etiology, Self-Regulation, & Monitoring Tools

Dietary restraint can be understood as the cognitive effort to eat less than one would like, and is an integral component in the development of eating disorders (16). However, dietary restraint is widely accepted as a healthful practice that does not always, or even a majority of the time, lead to the development of eating disorders (16,17). Schaumberg and colleagues posit that a self-regulation based model (Figure 1) can be used to conceptualize the potential for dietary restraint to lead to eating disorders and conclude that “providing individuals with tools to self-regulate successfully... should diminish problematic eating patterns and promote healthy weight management,” even allowing individuals to “simultaneously hold goals of...weight control along with the goal of eating pleurably” (16). Thus, this model of self-regulation can be used to expand on current research and explore the potential positive or negative impact of certain weight and nutrition monitoring tools on DE.

*Self-Monitoring as it pertains to nutrition.* Greater perceived deprivation may or may not reflect actual physiological state (e.g. caloric deficit or maintenance), but increases the risk of self-regulation failure and ED via counterregulatory eating and other mechanisms (16). Thus, inflexible approaches that increase perceived deprivation such as “good food, bad food” mentalities, rigid meal plans, or calorie or macronutrient counting may reduce the likelihood that an individual achieves their goal(s) and increase the

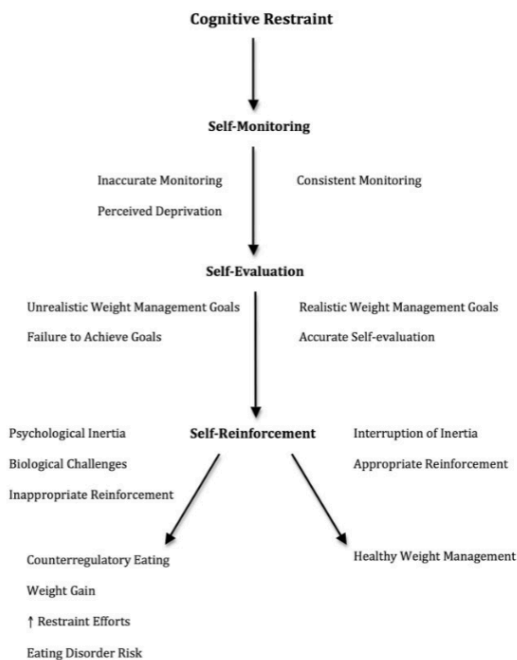


Figure 1: A self-regulation based model of successful and problematic outcomes of cognitive dietary restraint (P), with problematic outcomes (left) and successful outcomes (right).

risk of ED. However, reliance on hunger/satiety cues to be discussed, plate modeling (18) which has yet to be validated in athletic populations and is absent in the most recent IOC Athlete Nutrition Guide and AND Joint Position on Nutrition and Athletic Performance (19,20), and rudimentary energy prediction models (21-27) may greatly increase the risk of inaccurate monitoring, thereby also reducing the likelihood of goal accomplishment and increasing the risk of ED. A flexible control-based approach in which an individual can use a variety of foods to meet accurate but easy-to-understand needs likely avoids these pitfalls and allows for simple, consistent monitoring resulting in healthy weight management (28-31).

*Self-Monitoring as it pertains to weight.* Failing to educate individuals on how to properly use a scale to monitor their weight (if it is important for their health or success in sport), including proper conditions, frequency, expected fluctuations, identification of trends, and relation to body satisfaction may lead to inaccurate monitoring and thus increase risk of ED through a cascade of failing to achieve their goals, failing to interrupt their own psychological inertia, inappropriate reinforcement, and increased restraint efforts. When implemented appropriately, daily self-weighing (or weighing more frequently than once per week) has resulted in improved weight outcomes with no negative psychological effects (10,11).

*Self-Evaluation.* Failure to achieve goals is likely a key factor in the progressive breakdown of the self-regulation model eventually leading to increased risk

of ED (16). Achievement or failure of goals provides key feedback in self-regulation models, whether pertaining to nutrition targets, weight, or performance (16). Thus, potentially the best approach for supporting ordered eating is the accomplishment of realistic process and outcome goals. Of note are anecdotes from qualified practitioners (not referenced) supported by emerging research (32,33) expressing that ED are often manifestations of individuals exerting control in one area when they perceive that they don't have it in other areas of their lives, such as with the accomplishment of health, body image, or performance goals. Greater perceived self-efficacy through a strong understanding of how to achieve important yet realistic goals reinforced by success may increase levels of perceived control and reduce ED risk. It should be emphasized that self-efficacy may be degraded by usage of tools that do not support realistic goal achievement, and also degraded by the removal or discouragement of certain tools that may be helpful such as with scales when performance goals depend on weight (for example, with weight class sports). Thus, it is paramount that individuals learn proper usage of both internal and external monitoring tools.

Furthermore, conflicting standards that lead to negative outcomes as discussed by Schaumberg and others (16,34) likely manifest here whereby individuals are provided dissonant messages from various sources regarding how to achieve or evaluate process and outcome goal success. Common conflicting standards typically come from oversimplified messages such as a need to change weight for health or performance accompanied by a message that a scale weight is not important, or instruction to eat what one enjoys and based on hunger cues but also that one needs a specific gram amount of carbohydrate and protein before training in a specific time range. These conflicts may reduce realistic goal setting and goal achievement, degrading feelings of self-efficacy and control, and leading to increased restraint efforts and ED risk. However, a full review of these dissonant messages espoused by some practitioners and within many organizations is outside the scope of this discussion.

Goal achievement is of great relevance in group settings where individuals hold different definitions of success and limiting factors to achieving it, but because of a lack of access to necessary resources, goals are often not sufficiently addressed or monitored by qualified practitioners. Monitoring tools that break down individualized weight or nutrition targets into easily understandable, measurable, and achievable information thus hold the potential to support a strong,

centralized resource for individuals to accurately evaluate themselves and achieve outcome goals, as well as for practitioners to monitor and intervene earlier in response to challenges or failures.

*Self-Reinforcement.* Reinforcement encapsulates individual reactions to self-evaluation and represents an opportunity to halt the breakdown of the self-regulation model or to introduce behaviors that may lead to further breakdown (16). Reinforcement behaviors may be deemed inappropriate when psychological inertia or biological challenges increase risk of counterregulatory eating, uncontrolled weight, increased restraint efforts, or ED (16). Failure to interrupt psychological inertia, whether in regards to control of impulsive eating or negative thought patterns following goal failure, is identified as a major factor for ED risk (16). Tools that support the interruption of psychological inertia such as apps that provide clear pictures of why goals were missed, how to adjust appropriately, and also encourage third-party monitoring and intervention are likely to be effective in supporting healthy weight management and ordered eating, while other apps may enable psychological inertia. Biological challenges may be due to alterations in energy expenditure or psychological activity with nutrition or activity modification and render reinforcement strategies inaccurate (16). Nutrition recommendations as part of monitoring tools must account for these alterations and be dynamic so as to adjust with the constantly fluctuating variables that determine nutrition needs in order to support positive outcomes and avoid increasing the risk of negative outcomes.

*Reducing DE.* Individuals will incorporate many monitoring tools in support of dietary restraint efforts to achieve their goals. These tools may support ordered eating or disordered eating based on the interaction between characteristics of the tools and the individual using them. As discussed, tools that support ordered eating and reduce the risk of DE likely encourage: flexible control in regard to food choices, easy understanding of accurate nutrition needs, consistent monitoring of nutrition needs and weight, consistent messages as they pertain to nutrition and weight goals for health and performance, clear measures of success, successful goal outcomes and self-efficacy, weight control, third-party monitoring and intervention, and dynamic capabilities to meet the fluctuating nutrition needs of the individual (Table 1).

### **Nutrition Monitoring Practices & Athletes**

Nutrition, weight, body composition, and performance goals of athletes are significantly

### **Tools that support ordered eating and reduce the risk of DE likely encourage:**

1. Flexible control in regard to food choices
2. Easy understanding of accurate nutrition needs
3. Consistent monitoring of nutrition needs and weight
4. Consistent messages as they pertain to nutrition and weight goals for health and performance
5. Clear measures of success
6. Successful goal outcomes and self-efficacy
7. Weight control
8. Third-party monitoring and intervention
9. Dynamic capabilities to meet the fluctuating nutrition needs of the individual

*Table 1: A compiled list of attributes supportive of ordered eating based on a self-regulation model as it pertains to dietary restraint and eating disorders.*

different and often more numerous than for the general population (18).

Natural human feeding responses to exercise are highly variable, with some individuals exhibiting over-feeding and weight gain, some exhibiting under-feeding and weight loss, and others compensating to meet needs and exhibiting weight maintenance over time (35-39). Furthermore, while intuitive eating scores are inversely associated with body weight in the general population and practices are likely beneficial to health and ordered eating (39,40), results of intervention trials for weight management are largely underwhelming according to a recent literature review: mindfulness-based approaches may prevent weight gain but do not appear sufficient for weight change with only eight of 16 studies reporting weight loss and three of those reporting effect sizes great enough to be deemed significant weight loss (39). Macronutrient and micronutrient intake in response to exercise with the goal of optimizing performance or body composition also does not appear to be instinctive given that a majority of athletes fail to meet needs or regulate intake according to changes in training (18,41-47). Eating competence, which seeks to establish balance between wants and shoulds with eating on biological and psychosocial planes, is a more validated and evidence-based approach for performance and health (48).

External monitoring tools are likely to be beneficial in not only empowering athletes to achieve their goals, but also in reducing DE and ED risk in so doing. As discussed, certain practices and tools may be more or less beneficial in support of goal outcomes and ordered eating; a combination of tools is likely necessary. Nutrition professionals may increase or decrease DE in athletes based on how they select, educate on, and implement usage of monitoring tools.

Development and research into the impacts on health, DE, weight, and performance of a nutrition monitoring tool that encompasses all of the aforementioned beneficial attributes is warranted.

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