Appetite 118 (2017) 113–119

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Behavioral compensation before and after eating at the Minnesota State Fair

Richie L. Lenne [a, 1], Mary E. Panos [a, *, 1], Lisa Auster-Gussman [a], Heather Scherschel [b], Lucy Zhou [c], Traci Mann [a]

[a] Department of Psychology, University of Minnesota, Twin Cities, USA
[b] Department of Psychology, Washington and Lee University, USA
[c] Yale University, School of Public Health, USA

ARTICLE INFO

Article history:
Received 19 May 2017
Received in revised form
19 July 2017
Accepted 31 July 2017
Available online 2 August 2017

Keywords:
Self-regulation
Disinhibition effect
Self-licensing
Compensation strategies
Eating behavior

ABSTRACT

People regulate their eating behavior in many ways. They may respond to overeating by compensating with healthy eating behavior or increased exercise (i.e., a *sensible tradeoff*), or by continuing to eat poorly (i.e., *disinhibition*). Conversely, people may respond to a healthy eating event by subsequently eating poorly (i.e., *self-licensing*) or by continuing to eat healthily (i.e., *promotion spillover*). We propose that people may also change their behaviors in anticipation of an unhealthy eating event, a phenomenon that we will refer to as *pre-compensation*. Using a survey of 430 attendees of the Minnesota State Fair over two years, we explored whether, when, and how people compensated before and after this tempting eating event. We found evidence that people use both pre-compensatory and post-compensatory strategies, with a preference for changing their eating (rather than exercise) behavior. There was no evidence that people who pre-compensated were more likely to self-license by indulging in a greater number of foods or calories at the fair than those who did not. Finally, people who pre-compensated were more likely to also post-compensate. These results suggest that changing eating or exercise behavior before exposure to a situation with many tempting foods may be a successful strategy for enjoying oneself without excessively overeating.

After indulging in a highly caloric, high-fat meal, many people aim to reduce their food consumption for the rest of the day to offset the negative repercussions of the unhealthy behavior (Knäuper, Rabiau, Cohen, & Patriciu, 2004; Rabiau, Knäuper, & Miquelon, 2006). This compensatory behavior generally occurs *after* a self-regulatory lapse (e.g., watching what one eats after indulging at Thanksgiving dinner; Tomiyama, Moskovich, Haltom, Ju, & Mann, 2009) or *within* a single eating episode (e.g., ordering a diet soda to accompany a cheeseburger; Chandon & Wansink, 2007). It is also possible, however, that people compensate by changing their behavior *before* an event in which they anticipate indulging. This form of compensation, which we will refer to as "pre-compensation," is the focus of the current study.

People generally believe that they can offset, or compensate for, the negative effects associated with overeating by later restricting their eating or increasing their exercise (Knäuper et al., 2004; Rabiau et al., 2006), and there is evidence that in some circumstances, people may make *sensible trade-offs* to compensate for their lapses in self-regulation. For example, dieters who were compelled to consume a milkshake for a study compensated for those calories by subsequently eating less throughout the remainder of the day (Tomiyama et al., 2009), and non-dieters have been shown to do the same (Timko, Juarascio, & Chowansky, 2012).

At other times, however, people fail to compensate for unhealthy eating with healthier eating or increased physical activity. In a well-known series of studies (Herman & Mack, 1975), dieters who were required to break their diet by consuming a milkshake subsequently ate more ice cream during an in-lab taste-test than did non-dieters. This *disinhibition effect*, as it is called (Herman & Polivy, 1984), has been shown to occur when people have no choice but to remain in a room and sample tempting foods, rather than when they are free to choose their own activities and environments (e.g., Tomiyama et al., 2009). In sum, after a self-regulatory lapse, people can either compensate by changing their

* Corresponding author. Department of Psychology, University of Minnesota, 75 E River Road, Minneapolis, MN 55454, USA.
E-mail address: panos006@umn.edu (M.E. Panos).
[1] The first two authors contributed equally to the preparation of this manuscript.

http://dx.doi.org/10.1016/j.appet.2017.07.025
0195-6663/

behavior in healthy ways, or they may continue to act in unhealthy ways.

Although compensation is typically conceptualized in terms of behaviors completed after an *unhealthy* behavior in order to offset it, it is also possible to conceptualize compensation in terms of the behaviors that people allow themselves to engage in after behaving in a *healthy* way. *Self-licensing* refers to when people compensate for their healthy behavior by engaging in a subsequent unhealthy behavior (de Witt Huberts, Evers, & de Ridder, 2012). In one study, subjects were given either a sandwich that they perceived as healthy or a sandwich that they perceived as unhealthy and then were able to select the rest of their meal from a menu (Chandon & Wansink, 2007). The participants who were given the healthy sandwich ordered additional foods that ultimately made their meals less healthy than the meals of participants initially given an unhealthy sandwich. This suggests that a perceived self-regulatory success gave the participants license to indulge for the remainder of the meal. Similarly, in focus groups of regular exercisers, many people reported rewarding themselves with food on days that they exercised (Dohle, Wansink, & Zehnder, 2015). Furthermore, in a study in which physical activity was framed to be thought of as effortful exercise or as a fun scenic walk, people were more likely to increase their consumption of a dessert or snack when it was framed as exercise (Werle, Wansink, & Payne, 2015), again suggesting a *self-licensing* effect. Finally, in an experimental study of overweight and obese women, the majority (63%) compensated for a moderate-intensity exercise session by subsequently eating more or by being less active compared to after a rest session (Emery, Levine, & Jakicic, 2016).

However, it is also possible that people can respond to a healthy behavior by continuing to act in a healthy way. Although little research to date has examined how a healthy behavior could lead to a second, healthy behavior, in Dolan and Galizzi's (2015) review of behavioral compensation, when the performance of behavior A encourages the performance of behavior B in the same direction, it is referred to as a *promotion spillover*. An example of a positive promotion spillover is the finding that for some individuals, more frequent exercise encourages healthier eating behavior (Dohle et al., 2015).

In sum, people can respond to an eating event in multiple ways (see Table 1 for a summary). If the initial eating behavior is unhealthy, they may compensate by increasing healthy eating behavior (Tomiyama et al., 2009) or exercise (Dohle et al., 2015; Fleig, Küper, Lippke, Schwarzer, & Wiedemann, 2015) later in the day—the *sensible tradeoff* effect. However, for dieters, an unhealthy eating event may lead them to continue to eat poorly (at least for the rest of that meal; Herman & Mack, 1975; Herman & Polivy, 1984)—the *disinhibition* effect. Conversely, if the initial eating behavior is healthy, or if people have exercised (Dhar & Simonson, 1999; Dohle et al., 2015), they may then allow themselves to indulge in unhealthy foods (Chandon & Wansink, 2007) or to consume more food and/or be less active (Emery et al., 2016)—the *self-licensing* effect. Finally, the performance of a healthy behavior (e.g., exercise) sometimes promotes additional healthy behavior (e.g., eating) (Dohle et al., 2015)—the *promotion spillover* effect.

These four effects appear to occur spontaneously in response to engaging in a healthy or unhealthy behavior. The focus of our current work, however, is on the extent to which people plan ahead for upcoming unhealthy behavior by intentionally engaging in healthy behavior, or pre-compensating. We hypothesize that when people anticipate being exposed to a highly tempting eating event, they may pre-compensate by changing their eating or exercise behavior. We explore how common this behavior is, and how it influences subsequent eating behavior. Does compensating in anticipation of an eating event help people keep their consumption within their normal range of calories despite indulging in unhealthy foods at the event (i.e., a *sensible trade-off*), or does it result in greater overall consumption (i.e., *self-licensing*) compared to people who do not pre-compensate?

The current study addressed these questions by examining compensation behaviors that occur around a popular eating event: the Minnesota State Fair. The Minnesota State Fair is known for its remarkable assortment of unique and appetizing, yet highly caloric foods (e.g., fried cookie dough, macaroni and cheese on a stick). In fact, for many, the primary draw of the state fair *is* the food. Therefore, it is a setting in which people may be inclined to far exceed their normal caloric intake, and it is likely that many people go to the fair aware of this possibility, making the Minnesota State Fair an ideal setting to explore how people regulate their eating when surrounded by temptation. Using a survey of fairgoers, we examined the frequency of pre-compensation, and explored when, how, and which people compensated before and after this tempting eating event.

Table 1
Summary of relationships between sequential healthy versus unhealthy behaviors.

		Subsequent Behavior	
		Unhealthy	Healthy
Initial Behavior	Unhealthy	*Disinhibition*	*Sensible trade-off*
	Healthy	*Self-licensing*	*Promotion spillover*

1. Method

1.1. Participants

Participants were attendees of the Minnesota State Fair in two successive years. They were recruited after they entered or as they walked by a building dedicated specifically for research that housed multiple researcher teams studying a variety of topics in the social and health sciences. In Year 1, both data collection sessions were in the afternoon/evening from 3:00pm-9:00pm. In Year 2, two of the data collection sessions were in the afternoon/evening, and the other two sessions were in the morning/early afternoon from 9:00am-3:00pm. In order to participate, people indicated that they were over 18 years of age and that they had already eaten at least one food item at the fair that day.

Participants were 430 attendees (n = 198 in Year 1; n = 232 in Year 2; 91.5% White, 3.3% Asian/Asian-American, 1.0% Hispanic, 0.7% Black/African-American, and 3.5% multi-ethnic/other), between the ages of 18–83 years old ($M = 42.5$, $SD = 16.1$), 70.2% of whom were women. Participants reported an average body mass index (BMI) of 26.5 kg/m^2 ranging from 16 to 55 ($SD = 5.8$ kg/m^2).[2] There were no demographic differences across years. In Year 1, all participants were compensated with $5, and in Year 2, participants were entered into a raffle to win one of six $100 gift cards.

1.2. Procedure

After providing consent, participants completed a survey about their eating behavior at the fair so far that day, any changes that they had made to their eating and exercise behavior before the fair, and any changes they were planning to make after attending the fair. Participants in the Year 2 sample were also emailed a follow-up

[2] Four people neglected to report age, gender, and ethnicity. Nine people failed to report either weight or height, preventing the calculation of BMI.