

# The Myth of Comfort Food

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**Objective:** People seek out their own idiosyncratic comfort foods when in negative moods, and they believe that these foods rapidly improve their mood. The purpose of these studies is to investigate whether comfort foods actually provide psychological benefits, and if so, whether they improve mood better than comparison foods or no food. **Methods:** Participants first completed an online questionnaire to indicate their comfort foods and a variety of comparison foods. During two lab sessions a week apart from each other (and at least a week after the online questionnaire, counterbalanced in order), participants watched films that induced negative affect. In one session, participants were then served their comfort food. In the other, participants were served an equally liked noncomfort food (Study 1), a neutral food (Study 2), or no food (Studies 3 and 4). Short-term mood changes were measured so that we could seek out psychological effects of these foods, rather than biochemical effects on mood from particular food components (e.g., sugars or vitamins). **Results:** Comfort foods led to significant improvements in mood, but no more than other foods or no food. **Conclusions:** Although people believe that comfort foods provide them with mood benefits, comfort foods do not provide comfort beyond that of other foods (or no food). These results are likely not due to a floor effect because participants' moods did not return to baseline levels. Individuals may be giving comfort food "credit" for mood effects that would have occurred even in the absence of the comfort food.

**Keywords:** moods, emotions, eating, comfort food

Comfort foods, those high-calorie foods people consume when stressed, are believed to relieve negative moods and evoke a state of pleasure (Wansink, Cheney, & Chan, 2003). Yet, do they actually provide comfort, or do people just assume that they do? Negative moods naturally dissipate over time and do not last forever, so it could be that people misattribute this spontaneous process to comfort food rather than the simple passage of time. Although many researchers have investigated comfort foods, they tend to ignore the crucial question of whether these foods improve people's moods, and instead assess which foods individuals choose to eat when experiencing negative affect or stress. If there really is such a thing as a comfort food, it must, by definition, improve people's moods.

We could find only two studies that investigated the effect of consuming comfort foods in an experimental fashion. In one of the studies (Macht & Mueller, 2007), participants watched sad, happy, or neutral film clips and then ate chocolate or drank water. Following the sad film, chocolate improved mood significantly better than water. The researchers then used the same procedure to

compare palatable chocolate (milk chocolate) to unpalatable chocolate (70% or 99% dark chocolate) or to nothing. They found that, immediately after consumption, palatable chocolate improved mood more than unpalatable chocolate or no food. However, after three minutes, participants' mood did not differ between the three conditions. According to the graphed results in the article, self-rated mood did not return to baseline, so a floor effect is unlikely to have prevented differences between the conditions from being detected.

These studies stimulated several additional questions that our research addresses. First, we test whether it is the act of consuming palatable food—rather than specifically comfort food—that is mood-boosting. If comfort food is to be considered effective, it must do more for mood than other palatable foods, not just unpalatable foods. Second, the foods people find especially comforting seem to differ across individuals. Research partially confirms this intuition as men tend to select savory foods when stressed, whereas women choose sweets (Wansink et al., 2003). As far as we know, however, there is no research that examines whether people, in fact, possess any unique insight into the foods that work best to comfort them. Third, comfort food may improve mood only if one is given sufficient quantities of it. In the work described earlier (Macht & Mueller, 2007), participants received only five grams of chocolate, which is about one-ninth of a regular size Hershey's bar. This may not be enough to lead to mood improvements. Fourth, we explore whether comfort foods might inoculate individuals against developing a negative mood in the first place.

The purpose of the present research was to experimentally test the effectiveness of comfort foods in improving mood. In three within-subjects studies, we induced negative mood with film excerpts and then assessed whether participants showed larger mood

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improvements after consuming their personal comfort food compared to an equally liked food (Study 1), to a neutrally liked food (Study 2), or to no food (Study 3). In our fourth study, we assessed if consuming a commonly identified comfort food, chocolate, before a negative mood manipulation could *prevent* negative mood and if eating chocolate was more effective than simply receiving chocolate to eat later. If comfort foods “work,” participants will show larger decreases in their negative mood after eating their personal comfort food (or the chocolate) compared to eating a noncomfort food or nothing. In addition, if comfort foods work when eaten before an unpleasant event, then consuming chocolate prior to a negative mood induction should buffer participants against the effects of the mood induction and will be a more effective buffer than simply being given chocolate to consume later.

### Studies 1–3

#### Methods

**Participants.** A total of 110 students at a Midwestern university participated for extra credit in their psychology classes or for \$20.00. Three participants asked to leave the study without finishing because they were disturbed by the film clips, and seven participants were dropped due to Internet malfunctions, researcher error (e.g., showing wrong film), or the participant skipping ahead in the mood survey. This left 100 participants (67 females, mean age 24.8): 53 in Study 1, 23 in Study 2, and 24 in Study 3. These sample sizes provide power of .99, .86, and .87, respectively, to detect an effect of size .66 (Cohen’s *d*), which is the size found in the most comparable prior study (Macht & Mueller, 2007). (We found no evidence for gender as a moderator in any of the four studies in this manuscript.) When participants chose to end the study early, they were debriefed, shown a series of film clips designed to induce a happy mood and were kept in the lab until the experimenter felt they were feeling better. All of our methods were approved by the IRB committee at our university.

**Procedure.** In the first session, participants completed an online Food Opinion Questionnaire. Participants reported their top three comfort foods (“What foods would make you feel better if you were in a bad mood?”) and their top three equally liked noncomfort foods (“What foods do you like as much as the ones you just listed, but would not make you feel better if you were in a bad mood?”). Multiple distractor questions (e.g., “What foods would you want if you were on-the-go?”) were included to prevent participants from detecting the main focus of the study. In each instance, participants chose a response from a list of 20 food items. These items were preselected through an online preliminary survey in which 101 subjects rated 93 foods on 7-point scales of liking and of the belief that each food provided comfort. We selected 20 items that rated highly on both scales and that were reasonable to serve as a snack in the lab.

After participants designated their three comfort foods (and their three noncomfort foods), they specified (a) the desired flavor and brand of the items; (b) their confidence that the food would make them feel better (on a five-point scale); and (c) how much they liked the food (on a seven-point scale).

Sessions two and three, separated by at least one week, were completed in the laboratory after 11:00am. In each session, par-

ticipants watched one of two 18-min videos compiled from several film clips (see Materials section). After watching the video, participants completed the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), which is a 20-item questionnaire consisting of mood words (e.g., anxious) that individuals use to rate their current emotions on five-point scales from 1 (*very slightly/not at all*) to 5 (*extremely*). We added the words “sad” and “happy” to the measure to ensure coverage of these emotions, and we included them in the relevant subscales. The PANAS has been found to be a reliable (Cronbach’s alpha: 0.85–0.89; Crawford & Henry, 2004) and valid measure of short-term mood fluctuations in daily life (e.g., Clark, Watson, & Leeka, 1989) and in lab settings (e.g., Kuehner, Holzhauser, & Huffziger, 2007). In the studies reported here, the subscales were highly reliable at every time point in each study (Cronbach’s alpha: .78 to .91 for positive mood and .89 to .92 for negative mood). Our focus is the negative mood subscale, as the items on it pertain to the moods we aimed to induce in our mood manipulation (e.g., upset, scared, hostile, afraid, and irritable).

In either session two or three (in counterbalanced order), participants received their comfort food and were left alone for three minutes to eat it. We made every effort to provide participants with their highest rated comfort food and to obtain the brand and flavor of the item they described. We were always able to provide participants with one of their top three listed comfort foods. Each participant received three times the suggested serving size of the selected food to prevent them from running out, which itself might influence their mood.

In the remaining session, participants received a food that they rated as an equally liked noncomfort food (in Study 1) and then were left alone for three minutes to eat it. At the end of the three minutes, a researcher removed the food from the room and instructed participants to complete the mood questionnaire. At the end of each session, participants watched the film clips shown to induce happy moods and, at the end of the third session, were fully debriefed.

The methods of Study 2 were identical to Study 1, except instead of receiving an equally liked noncomfort food in one of the sessions, participants received a neutral food. Oats and honey granola bars (Nature Valley or Millville brands, removed from packaging) were selected as the neutral comparison food based on the previously described online survey because “granola bars” rated closest to the midpoint on the scales of both liking and comfort. The methods of Study 3 were identical to Studies 1 and 2 except participants received no food instead of a noncomfort food, and then they waited in silence for three minutes prior to completing the mood measure.

**Materials.** We created the two 18-min video clip compilations through extensive pilot testing. First, research assistants ( $n = 12$ ) nominated film clips that they thought would elicit anger or hostility, fear, anxiety, and/or sadness, and then they rated all of the clips for how much each clip elicited the target moods. We reduced the sample of video clips based on these ratings, and then participants ( $n = 46$ ) from the Psychology department subject pool rated this smaller selection of clips on all of the target moods. Based on these ratings, we chose the clips that elicited the strongest feelings of anger, fear, anxiety, and/or sadness, creating two 18-min compilations of clips that, on average, induced similar amounts of these moods. The particular compilation we gave to

participants each session was crossed with food conditions so the compilation would not be confounded with condition, and no differences in induced moods were found between the two compilations [values for  $t(98)$  ranged from .21 to .72;  $p$  values ranged from .47 to .83, for two measures each of positive mood and negative mood].

## Results and Discussion

The most commonly provided comfort foods were chocolate (26%), ice cream (18%), cookies (11%), and brownies (8%). Eighty-one percent of participants either agreed or strongly agreed with the statement "I am confident that eating this food would make me feel better." The most commonly provided equally liked noncomfort foods (Study 1) were almonds (15.1%), cashews (13.2%), brownies (9.4%), and popcorn (9.4%).

In all three studies, a two (food type: comfort food vs. noncomfort food/no food)  $\times$  two (time: before vs. after eating) repeated measures ANOVA was conducted separately on negative mood and on positive mood subscale scores. If comfort food provided any mood-improving benefit over the noncomfort food, we should find a significant interaction between time and food type. However, significant interactions between time and food type for negative mood did not occur in any of the three studies: Study 1,  $F(1, 52) = .57, p = .45$ ; Study 2,  $F(1, 22) = .48, p = .49$ ; or Study 3,  $F(1, 23) = .15, p = .70$ .

Figure 1 shows that participants' moods improved over time: main effect of time in Study 1,  $F(1, 52) = 123.79, p < .001$ ; Study

2,  $F(1, 22) = 76.40, p < .001$ ; and Study 3,  $F(1, 23) = 38.77, p < .001$ . However, as the lack of an interaction with food type indicates, this happened to the same extent regardless of which type of food they ate or whether they ate any food at all. In addition, there was no main effect of food type on negative mood in any of the three studies: Study 1,  $F(1, 52) = .36, p = .55$ ; Study 2,  $F(1, 22) = 1.00, p = .33$ ; Study 3,  $F(1, 23) = 2.54, p = .13$ .

Although our focus was negative mood (since that is what we induced), all analyses were also conducted on positive mood scores. Positive mood results parallel those for negative mood, but in the opposite direction, except that participants given no food (Study 3) had a decrease in positive mood (indicated by a significant interaction between time and food type,  $F(1, 23) = 9.33, p = .006$ ).

We found that comfort food was not significantly more effective at improving a negative mood than an equally liked food (Study 1), a neutral food (Study 2), or no food (Study 3). In addition, it is not the case that participants get comfort only when they eat a food that they believe will comfort them, as there was no correlation between participants' confidence the food would comfort them and their change in mood ( $r = .069, p = .50, n = 99$ ). The amount of food they consumed also did not correlate with the change in mood ( $r = -.12, p = .23, n = 99$ ).

In order to minimize the number of times participants completed our mood measure and thereby minimize demand effects, we did not collect a pre-film mood measure. Thus, it is possible that participants returned to their pre-mood-induction baseline, pre-

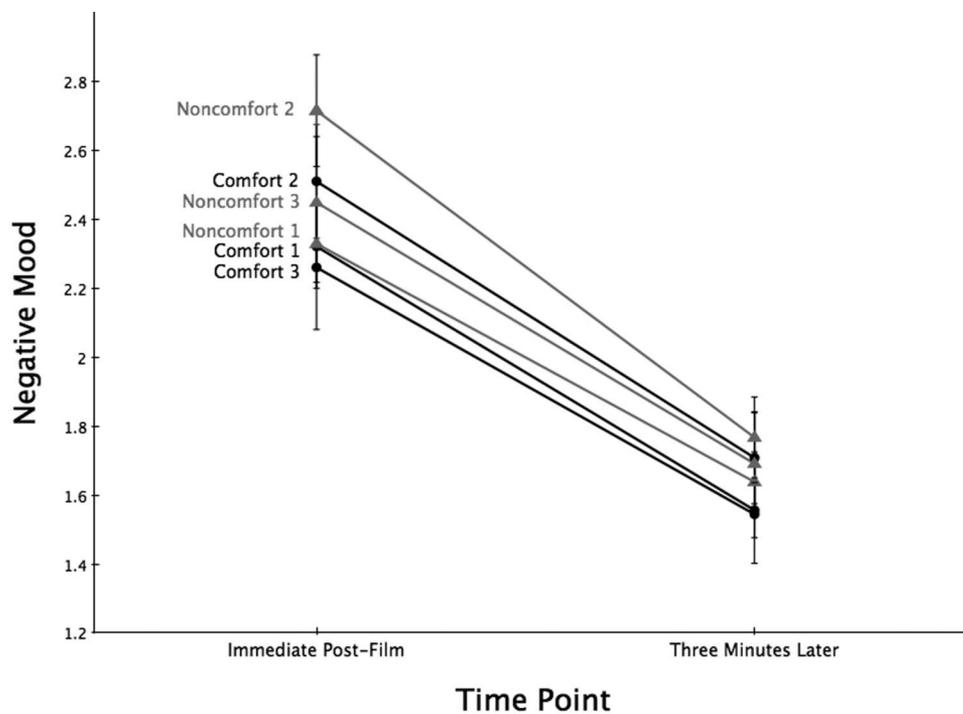


Figure 1. Mean negative mood ( $\pm$  SE) before and after comfort food or equally liked noncomfort food (Study 1), neutral food (Study 2), or no food (Study 3). (The numbers in the condition labels refer to the study number.) Circles and solid black lines represent the comfort foods. Triangles and gray lines represent the noncomfort foods or no food.

venting us from detecting differences between the comfort food conditions due to potential floor effects (although it is also possible for people's moods to improve beyond the mood they had when they arrived for the study). Therefore, we ran Study 4, which included pre-film mood measures.

### Study 4

Study 4 tested whether consuming comfort food *before* the negative mood manipulation might minimize the increase in negative affect from watching the film. In addition, to tease out whether simply *receiving* a liked food has mood effects (akin to receiving a gift), we included a condition in which participants received chocolate before the mood induction that they could eat after the study. Study 4 used a between-subjects design and included four conditions: pre-film chocolate consumption, post-film chocolate consumption, pre-film receiving but not eating chocolate (pre-film gift condition), and no chocolate. Because chocolate was the most commonly provided comfort food in Studies 1–3, we used it as the comfort food in this study.

### Method

**Participants.** A total of 151 students at the same Midwestern university participated in Study 4 for extra credit in their psychology classes or for \$5.00. Of these participants, nine were dropped because they did not complete all the surveys (either due to researcher error or computer malfunctions), and five participants chose to terminate the study early because they were disturbed by the film. This left a total of 137 participants (99 females), with a mean age of 22.2 ( $n = 35$  in the no chocolate condition and  $n = 34$  in each of the other conditions), which provided power of .78 to detect an effect comparable to that in the literature (Macht & Mueller, 2007).

**Procedure.** Participants were run in groups of one to six in the lab after 11:00am. Within each group, all participants were in the same experimental condition. Each participant sat at their own desk (if alone) or cubicle (if run in a group) and could not see the other participants. Participants first completed the same mood questionnaire (Watson et al., 1988) as in Studies 1–3. Next, a 3-min block followed in which participants received chocolate to eat right then (pre-film chocolate condition), received chocolate to eat later (pre-film gift condition), or sat quietly without engaging in other activities (post-film chocolate and no chocolate conditions). After three minutes, the researcher instructed participants to complete the mood questionnaire again, so that it would be possible to isolate any immediate effects of receiving or consuming chocolate.

Participants then watched a shortened version (12 minutes in length) of the films used in Studies 1–3. Participants used headphones to watch the film in the darkened room. Immediately after the film, participants again completed the mood questionnaire. Another 3-min block followed in which participants received chocolate to eat right then (post-film chocolate condition) or sat quietly (all other conditions). Finally, participants completed the mood questionnaire a final time and answered questions about their liking for chocolate (79.6% of participants liked chocolate “very much” or “extremely”) and if chocolate was one of their comfort foods (46% of participants rated chocolate as one of their top three comfort foods).

### Results and Discussion

A two-way repeated measures ANOVA with one between-subjects factor (four levels of food condition) and one within-subjects factor (three time points) was conducted on negative mood with Time 1 mood as a covariate. As in the earlier studies, participants exhibited significant changes in mood over time,  $F(2, 131) = 23.77, p < .001$  (See Figure 2). To understand these changes, planned contrasts were conducted between successive

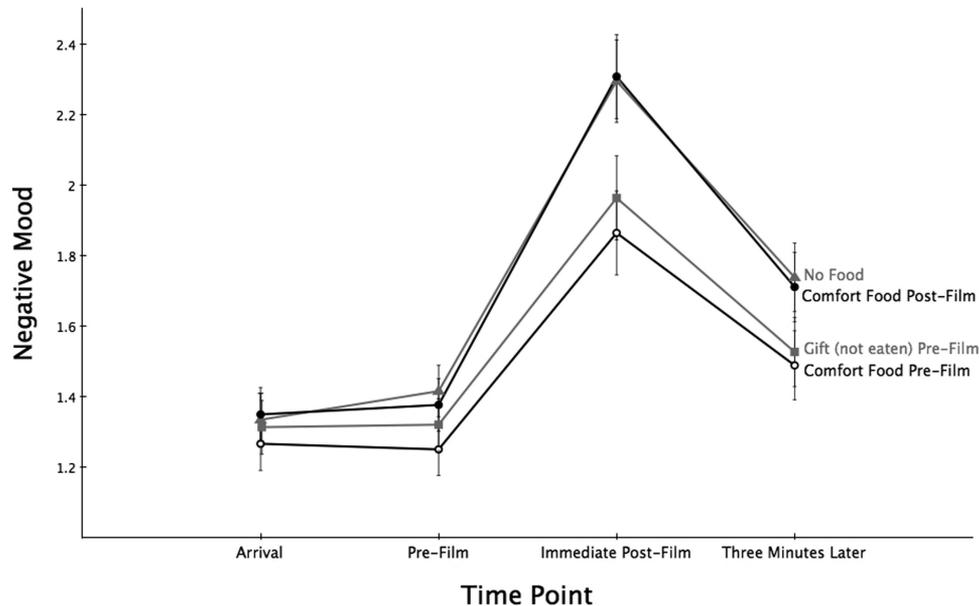


Figure 2. Mean negative mood ( $\pm$  SE) for participants in the four conditions of Study 4.

time points. Overall, without accounting for food condition, negative mood remained steady from baseline until the film started,  $t(136) = -.94, p = .35$ . Participants' moods became significantly more negative immediately after viewing the film,  $F(1, 133) = 41.76, p < .001$ , and then improved after the 3-min post-film period,  $F(1, 133) = 35.92, p < .001$ . However, participants' moods still remained significantly more negative than baseline,  $t(136) = -6.97, p < .001$ , suggesting that the comfort food likely still had "room" in which it could work.

Consuming comfort food after the film was no more effective at improving mood than eating nothing after the film. This is evident from the overlapping lines in Figure 2 as well as an ANCOVA on the final mood measure (controlling for Time 1 mood), in which no between group differences were found,  $F(3, 132) = 1.64, p = .183$ . This replicated the findings from Study 3, in which comfort food also showed no advantage over no food.

There is some evidence that eating chocolate prior to the film or even just receiving it prior to the film may have reduced the negative effects of the film. Although the interaction between food condition and time is not statistically significant,  $F(6, 262) = 1.47, p = .189$ , a between-groups ANCOVA of negative mood at the third time point indicates significant between-groups differences immediately after seeing the film,  $F(3, 132) = 3.51, p = .017$ .

As is evident in Figure 2, participants who consumed chocolate before the film ( $M = 1.89$ ) were significantly less upset by the film than participants in the no food condition ( $M = 2.28; t(132) = 2.49, p < .02$ ) and the chocolate post-film condition ( $M = 2.29; t(132) = 2.51, p < .02$ ). Similarly, participants who simply received chocolate before the film were significantly less upset ( $M = 1.96$ ) by the film than participants in the no food,  $t(132) = 2.03, p < .05$ , or the chocolate post-film conditions,  $t(132) = 2.06, p < .05$ . There was no difference in the moods of participants who consumed the chocolate or just received it to save for later,  $t(132) = .46, p > .64$ . Any effect of eating or receiving chocolate before the film disappeared by the final mood measure, however, in which no between group differences were found.

Parallel analyses were conducted on positive mood, and the results confirm that comfort food provided no benefits beyond other foods or no food. Effects mirrored those of negative mood for time,  $F(2, 131) = 10.04, p < .001$ , except that whereas negative mood started to improve (i.e., get lower) by three minutes after the film, positive mood declined from when participants arrived at the study until they left the study. The only deviation from this pattern appeared with participants who ate chocolate prior to the film. Their positive mood remained positive until the film started, but then it declined through the end of the study like all other participants' mood (time by condition interaction:  $F(6, 262) = 3.85, p < .001$ ). No other effects were evident for positive moods.

## General Discussion

The belief that eating certain foods will comfort us is ubiquitous in our culture. However, our results suggest that this belief may be a myth. In what we believe are the first experimental tests of the effects of people's own selected comfort foods on mood, we found that consuming a comfort food was no more effective at improving negative mood than consuming an equally liked food (Study 1), a neutral food (Study 2), or no food (Studies 3 and 4).

Although we expected that consuming chocolate prior to a negative mood induction might minimize the effects of that mood induction, we were surprised that merely receiving it had a similar effect. Others have shown that a sweet taste can be calming (Kassab, Sheehy, King, Fowler, & Foureur, 2012) and that people are typically irritable when hungry and calm when full (Gibson, 2006). Thus, we expected that the taste and calories delivered by the chocolate would be largely responsible for its ameliorating effect on negative mood. Those receiving chocolate to eat later would not have had the rewarding experience of having consumed it, and yet this was just as effective at preventing negative mood as was consuming chocolate. Perhaps prior experience and associations with eating chocolate were sufficient for reducing the effects of the negative mood induction.

The goal of our study was to systematically test the effectiveness of comfort foods. We used participants' unique comfort foods (in three studies), provided sufficient amounts of food, used lengthy and potent mood inductions, and used a well-established mood measure, yet we still failed to find that a comfort food improved mood better than other foods or no food. However, the studies did contain some limitations. First, we used only one kind of mood manipulation, video compilations. We chose this method because a meta-analysis found viewing film clips to be the most effective manipulation for inducing negative moods (Westermann, Spies, Stahl, & Hesse, 1996). Additionally, we opted to repeatedly use this manipulation, which did significantly increase negative mood, in order to allow for as close to direct replication as possible across the four studies. Future research might test these hypotheses with other mood manipulations.

In addition, to test the comfort food hypothesis, we had to measure self-reported mood repeatedly within the same study session. To address possible demand effects, we used different procedures in the multiple studies. In Studies 1–3, in which participants answered questions about comfort food the week before the lab sessions, participants responded to mood questions only twice during each lab session. In Study 4, participants completed the mood measure multiple times but reported their comfort food only after all mood measures had been completed. Beyond these design precautions, it also seems unlikely that a demand effect explanation could account for the full pattern of our findings across all four studies.

A third limitation of these studies is that they were conducted in laboratory settings. Perhaps comfort food is effective only outside of the lab, or maybe the mood-boosting aspect of comfort food is not actually consuming it but is seeking it out and acquiring it. Although this does not fit with our intuitions or with popular portrayals of comfort foods, it may be worth testing in future studies.

As in the literature, we assumed that eating comfort food would have an immediate psychological effect (Macht & Mueller, 2007). Of course, foods may also improve mood through physiological effects of certain food elements or nutrients (e.g., sugars, vitamin D), which would only appear after a significant time delay. Exploring biochemical effects of that nature was not the point of the current work. Instead, we deliberately measured mood shortly after comfort food was consumed so that we could test for psychological effects *separately* from any effects that might result due to physiological effects of different food components. There is marked variability in the different foods individuals turn to for

comfort (e.g., many people choose comfort foods that do not contain sugar), and physiological effects of certain nutrients could not explain how all of these different foods would provide comfort, nor could they explain the immediate comforting effects that individuals expect their comfort foods to have.

Although we were surprised by our findings in this investigation, we believe we created a fair test of the comfort food hypothesis. We found significant effects of our mood inductions and food manipulations, and, as we report in the methods sections, we had ample power to detect differences the size of those found in previous research (Macht & Mueller, 2007). Importantly, in our studies, comfort foods *did* lead to significant improvements in mood; they just did not lead to larger mood improvements than other foods or even no food at all.

These findings have important implications for individuals who are attempting to seek comfort or lose weight and provide clear advice for clinicians to offer them. We found no justification for people to choose comfort foods when they feel distressed. Individuals will get the same results—a steady decrease in negative mood—from eating another palatable food, a neutral food, or nothing at all. Beyond showing intuition about comfort food is misguided, our work also provides the empirical evidence clinicians need to inform patients that comfort foods will not make them feel better. Removing an excuse for eating a high-calorie or high fat food may help people develop and maintain healthier eating habits, and may lead them to focus on other, food-free methods of improving their mood.

Finally, from these results, we can understand why people have such strong beliefs in the effectiveness of eating comfort food. If individuals eat comfort food and their mood improves, it would make sense to give the “credit” specifically to the comfort food. They might not notice that eating other foods (or no food at all) does the job just as well.

## References

Clark, L. A., Watson, D., & Leeka, J. (1989). Diurnal variation in the positive affects. *Motivation and Emotion, 13*, 205–234. doi:10.1007/BF00995536

- Crawford, J. R., & Henry, J. D. (2004). The positive and negative affect schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43*, 245–265. doi:10.1348/0144665031752934
- Gibson, E. L. (2006). Emotional influences on food choice: Sensory, physiological and psychological pathways. *Physiology & Behavior, 89*, 53–61. doi:10.1016/j.physbeh.2006.01.024
- Kassab, M., Sheehy, A., King, M., Fowler, C., & Foureur, M. (2012). A double-blind randomised controlled trial of 25% oral glucose for pain relief in 2-month old infants undergoing immunisation. *International Journal of Nursing Studies, 49*, 249–256. doi:10.1016/j.ijnurstu.2011.09.013
- Kuehner, C., Holzhauer, S., & Huffziger, S. (2007). Decreased cortisol response to awakening is associated with cognitive vulnerability to depression in a nonclinical sample of young adults. *Psychoneuroendocrinology, 32*, 199–209. doi:10.1016/j.psyneuen.2006.12.007
- Macht, M., & Mueller, J. (2007). Immediate effects of chocolate on experimentally induced mood states. *Appetite, 49*, 667–674. doi:10.1016/j.appet.2007.05.004
- Wansink, B., Cheney, M. M., & Chan, N. C. (2003). Exploring comfort food preferences across age and gender. *Physiology & Behavior, 79*, 739–747. doi:10.1016/S0031-9384(03)00203-8
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scale. *Journal of Personality and Social Psychology, 54*, 1063–1070. doi:10.1037/0022-3514.54.6.1063
- Westermann, R., Spies, K., Stahl, G., & Hesse, F. W. (1996). Relative effectiveness and validity of mood induction procedures: A meta-analysis. *European Journal of Social Psychology, 26*, 557–580. doi:10.1002/(SICI)1099-0992(199607)26:4<557::AID-EJSP769>3.0.CO;2-4

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