Commentary

Standardizing versus measuring food deprivation and hunger

Adrian Meulea,b,∗

a Department of Psychology, University of Salzburg, Salzburg, Austria
b Center for Cognitive Neuroscience, University of Salzburg, Salzburg, Austria

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Robinson, Bevelander, Field, and Jones (2018) examined the methods used in laboratory food intake studies. Amongst other variables, they coded whether the studies standardized appetite in terms of participant fasting instructions or appetite standardization as part of the laboratory visit. Approximately 30% of studies did not use such standardization techniques. The authors recommend ensuring appetite is standardized across participants prior to a laboratory test meal to reduce undesirable variability in measurements of eating behavior. This commentary scrutinizes this recommendation in terms of feasibility and possible disadvantages.

1. Participant fasting instructions

One approach to standardizing hunger levels is to instruct participants not to eat immediately (e.g., within 1, 2, or 3 h) before the laboratory visit (e.g., Rogers & Hardman, 2015). Yet, does this actually standardize appetite? It turns out that such instructions result in substantially longer mean food deprivation than intended. For example, in two studies in which participants were asked to refrain from eating at least 3 h before the laboratory visit, mean self-reported time since the last meal was $M = 5.2$ h ($SD = 2.8$) in study 1 ($n = 50$) and $M = 7.5$ h ($SD = 4.9$) in study 2 ($n = 102$; Meule et al., 2014). In two other studies in which participants were asked to refrain from eating at least 1 h before the laboratory visit, mean self-reported time since the last meal was $M = 5.0$ h ($SD = 3.7$, $n = 56$; Meule, Skirde, Freund, Vögele, & Kübler, 2012) and $M = 4.6$ h ($SD = 5.1$, $n = 70$; Meule, 2016). These long and highly varying food deprivation periods can be partly explained by participants who were tested in the morning and did not eat breakfast and, hence, calculating the time since the last meal on the previous day usually results in food deprivation periods of more than 10 h. Thus, participant fasting instructions—in terms of specifying a minimum food deprivation period without specifying a maximum food deprivation period—do not seem to be an optimal choice.

2. Participant eating instructions

Instead of only instructing participants not to eat immediately before the laboratory visit, it seems necessary to additionally instruct them to eat something at a given time. For example, participants may be instructed to eat breakfast at 7 a.m. when they are tested in the laboratory at 10 a.m. While this solves the problem of exceptionally long food deprivation periods, it may interfere with the daily routine of the participants (e.g., creating an unnatural situation for participants that do not eat breakfast regularly; Yeomans, 2018). While this problem can be addressed by excluding certain individuals (e.g., non-breakfast eaters), it still relies on the goodwill of participants, that is, there is no control if they actually adhered to such instructions. Finally, such instructions would also have to include the exact type and amount of food that participants should eat, which may further reduce the likelihood that participants exactly follow instructions.

3. Appetite standardized as part of laboratory visit

The problem of non-adherence can be solved by providing participants with a standardized meal in the laboratory. Yet, this does also include some issues, for example, whether portion size should be
4. Food deprivation versus hunger

It may also be that the timing of participants’ last meal may not be such a crucial issue after all. Although current hunger relates to food intake in the laboratory (Robinson et al., 2017; Sadoul, Schuring, Mela, & Peters, 2014), it is worth noting that food deprivation does not equal hunger. Although food deprivation and current hunger are positively correlated, this association is of weak or moderate magnitude (about $r = 0.3–0.4$; e.g., Cepeda-Benito et al., 2000; Meule & Hormes, 2015). Thus, even when achieving that food deprivation is similar across all participants, this does not guarantee similar hunger levels in the laboratory across all participants.

5. Conclusion

As Gibbons, Finlayson, Dalton, Caudwell, and Blundell (2014) and Yeomans (2018) note, there is no overall recipe for designing food intake studies. Both standardizing and not standardizing appetite have benefits and limitations. Not standardizing appetite can produce undesired variability in hunger levels and asking participants to report the time since their last meal can be prone to inaccuracies. The practical implementation of standardizing appetite, however, can be problematic and can reduce generalizability of findings. If the variability in hunger levels (which is reduced by standardization) is actually desired (or at least does not adversely affect interpretation of results), then standardization may not be necessary. When measuring food deprivation (i.e., time since participants’ last meal) and current hunger without standardizing appetite, these variables can be used as covariates or moderators in the statistical analyses.

To summarize, this commentary argues that if researchers want to reduce undesired variability in hunger levels, caution should be exercised when recommending standardization of appetite. For example, participant fasting instructions (in terms of specifying a minimum food deprivation period without specifying a maximum food deprivation period) should not be used because they result in longer food deprivation than intended and are unlikely to produce similar food deprivation periods and hunger levels across participants. Thus, participant eating instructions or providing participants with fixed meals should be preferred here. If variability in hunger levels is desired, however, a lack of standardization of appetite should not be regarded as a criterion of poor methodology. Laboratory food intake studies, provided that food deprivation and current hunger are measured.