

Brief research report

The psychological effects of blind and open weighing in women with a high drive for thinness: A mixed method inquiry



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ABSTRACT

Regular weighing is a routine component of public health interventions but concerns have been raised about possible negative psychological consequences. Blind weighing is an alternative form of weighing that is commonly used in clinical contexts, and that is thought to decrease weighing anxiety and engagement with disordered eating behaviours. In this study, normal weight female participants who indicated a high drive for thinness ($N = 53$) were randomly assigned to receive bi-weekly open or blind weighing for three weeks. Participants who were open weighed felt increasingly anxious over time, whereas participants who were blind weighed felt less anxious. Both groups experienced increased weight preoccupation and disordered eating behaviours on weighing days compared to non-weighing days. Analyses of participants' qualitative responses further indicated that open weighed participants experienced increased urges to engage in weight-controlling behaviours throughout the experiment whereas blind weighed participants reported reduced concern with weight. Findings suggest that blind weighing may be a safer approach to weight monitoring, even though weighing in both forms can have a (transient) negative effect. Future research should evaluate whether the current findings are generalisable for other subgroups of the population.

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1. Introduction

Regular weighing is a routine component of public health interventions across age groups and the weight spectrum. For example, the Centre for Disease Control and Prevention recommends weight monitoring in both children and adults to prevent and reduce overweight and obesity (CDC, 2020). However, at least in some subgroups of the population, this focus on weight could potentially have adverse or unintended consequences such as weight concern and preoccupation, body dissatisfaction, and increased vulnerability to onset of disordered eating (Watson, 2011).

Weighing¹ usually involves the person stepping on the scale and seeing the weight, also referred to as “open weighing”. An alternative approach is “blind weighing,” in which the person being weighed does not see their weight. Blind weighing is commonly used in treatment for eating disorders (EDs; Forbush et al., 2015) on the assumption that withholding exact weight information might serve

to minimise distress and preoccupation with weight and foster tolerance of weight uncertainty (Forbush et al., 2015; Kesby, Maguire, Brownlow, & Grisham, 2017). Although research evaluating the effects of blind weighing is scarce, one qualitative study conducted with ED patients found that they preferred blind weighing over open weighing because their experience was that it decreases anxiety about being weighed, minimises urges to engage in ED behaviours, and reduces overconcern with weight (Froreich et al., 2020).

Despite the widespread use of blind weighing in clinical contexts, it is yet to be evaluated in the general population. This study aimed to explore whether blind weighing could be a useful alternative to open weighing to reduce the risks of negative consequences of weighing. We preselected normal weight, university-aged women who indicated a high drive for thinness (DFT). DFT is defined as an excessive concern with dieting, preoccupation with weight, and fear of weight gain (Garner, 1991), and is highly correlated with ED pathology (Garner, Olmstead, & Polivy, 1983). Thus, this sample was expected to be particularly vulnerable to the potential adverse effects of weighing. Participants were either open or blind weighed twice weekly over a three-week period, and reported on their weight-related anxiety and ED pathology. This study was largely exploratory but, based on findings from Froreich and colleagues

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¹ Regular weighing can be done by oneself (i.e., self-weighing) or others (i.e., other-weighing). In the context of the current study, the focus is on other-weighing.

(2020), we tentatively predicted that the blind-weighing group would report less weight-related anxiety and ED pathology following the experiment compared to the open-weighing group.

2. Method

2.1. Participants

Participants were 53 women enrolled in an introductory psychology course at a large Australian university. Participants were recruited based on their responses to the DFT subscale of the Eating Disorder Inventory-2 (EDI-2; [Garner, 1991](#)) that they completed during participant pre-screening at the start of the academic semester. Individuals with scores in the upper tertile (i.e., a mean score of 3.5 or higher) and not currently in ED treatment were eligible to participate. Data from two participants were excluded, one because she failed to follow the experimental protocol and another because she dropped out of her university degree after Session 3. The mean age of the final sample ($N = 51$) was 20.22 years ($SD = 4.10$) and the mean BMI was 21.89 ($SD = 2.12$). Participants identified primarily as White/Caucasian ($n = 25$), followed by Asian ($n = 18$), and “other” ($n = 8$). Data were collected between February and May 2018.

2.2. Procedure

Participants signed up for a study titled “The effects of different weighing practices on young adults”. After providing informed consent, participants were randomly assigned to the open- or blind-weighing condition and were asked to refrain from weighing themselves outside of the laboratory sessions for the duration of the study (3 blind-weighed and 5 open-weighed participants did not adhere to this request; 15.4%).²

Participants came to the lab to be weighed twice weekly over a three-week period (i.e., six times in total). At each weighing session, participants first rated their anxiety about being weighed before stepping on the scale. Participants were then weighed on a digital scale by a member of the research team. In the open-weighing condition, the outcome was communicated clearly to the participant (“Your weight today is X kilograms”). In the blind-weighing condition, participants stepped on the scale backwards with the number on the scale covered. Weight information was recorded by the researcher but was not shared or discussed with the participant. All participants were aware that the experimenter was recording their weight.

In Sessions 1, 4, and 6, participants completed questionnaires on the lab computer after being weighed. In Session 1, participants’ height was also measured to calculate their BMI. In addition to the measures completed in the lab, participants completed daily online end-of-day surveys. These surveys measured daily preoccupation with weight and engagement in disordered eating behaviours. At the end of Session 6, participants were debriefed, provided with relevant referral information, and assigned research credit. This study was approved by the university’s ethics committee.

2.3. Measures

Participants completed a number of measures which, theoretically, could be differentially affected by the two weighing practices. These included weight-related anxiety, intolerance of weight uncertainty, weight preoccupation, and weight importance. Single-items were used where possible to reduce the overall survey length and completion time given the repeated assessment.

² Excluding these participants from the analyses did not change the results. Thus, the full sample was retained in the analyses.

2.4. Pre-screening

2.4.1. Drive for thinness

The DFT subscale ([Garner, 1991](#)) consists of seven items, responded to on a six-point scale (1 = *Never*, 6 = *Always*). Although internal consistency was low ($\alpha = 0.60$), this measure was only used to identify eligible participants for the study.

2.5. Lab questionnaire

2.5.1. Weight-related anxiety

Weight-related anxiety (“How anxious are you about being weighed right now?”) was measured using a visual analogue scale ranging from 0 (*Not at all anxious*) to 100 (*Extremely anxious*).

2.5.2. ED attitudes and cognitions

Core ED attitudes and cognitions were assessed using the 10 attitudinal items that address weight, shape, and eating concerns from the Eating Disorder-15 (ED-15; [Tatham, Turner, Mountford, Tritt, Dyas, & Waller, 2015](#)). All items were scored on a seven-point scale (0 = *Not at all*, 6 = *All the time*), with higher mean scores indicating greater ED pathology. Cronbach’s alpha for the global score across sessions ranged between .92 and .94.

2.6. End-of-day questionnaire

2.6.1. Weight preoccupation

Weight preoccupation (“How preoccupied have you been with your weight today”) was assessed using a visual analogue scale ranging from 0 (*Not at all*) to 100 (*Extremely preoccupied*).

2.6.2. Disordered eating behaviours

Engagement in disordered eating behaviours was assessed daily via 15 dichotomous (yes = 1, no = 0) questions addressing dietary restraint (8 items), uncontrolled eating (4 items), and compensatory behaviours including purging, laxative use, and excessive exercise (3 items). These items were compiled from two existing instruments: the EDE-Q ([Fairburn & Beglin, 2008](#)) and the Three-Factor Eating Questionnaire Revised-18 ([Karlsson, Persson, Sjöström, & Sullivan, 2000](#)). This subset of items was selected to ensure that the measure was relevant to a non-clinical sample (i.e., by taking out items that the current sample were unlikely to endorse). Internal consistency of this purpose-designed scale was good throughout this study ($\alpha = 0.91$).

2.6.2.1. Demographics. Participants reported their age and ethnicity. Height and weight were measured in session by the research team and were used to calculate BMI.

2.6.2.2. Qualitative questions. The survey completed at the final session (Session 6) contained three open-ended questions asking participants: (1) how they experienced the study; (2) if the study had any positive effects on them; and (3) if the study had any negative effects on them. These questions were optional (49/51 participants responded).

2.7. Data analyses

Group equivalence on baseline measures was established using independent samples *t*-tests. Mixed-model ANOVA was used to assess the effects of condition on the outcome variables, with condition (open vs. blind weighing) as the between-subjects factor and session as the within-subjects factor. Results were corrected for violation of sphericity using the Greenhouse–Geisser approach to epsilon correction of degrees of freedom. Weight-related anxiety, which was assessed at six time points, was affected by sporadic non-

attendance. Given that a number of data points were available for this measure and ratings occurred in close temporal proximity, missing values (1.3%) were replaced with the mean anxiety rating of the adjacent cells (i.e., mean anxiety-scores from sessions on either side of the missed session) on a person-by-person basis (Winer, 1971). This approach helped improve statistical power and avoid potential selection bias (Allison, 2002). Significant omnibus session effects were followed by subsequent analyses of simple effects.

Multilevel modelling was conducted on end-of-day surveys using HLM 7 software (Raudenbush et al., 2010). First, we compared the effects of condition (open vs. blind weighing) on daily weight preoccupation and disordered eating behaviours. Second, we investigated whether daily weight preoccupation and disordered eating behaviours were associated with time relative to weighing day (i.e., whether significant changes in weight preoccupation and/or disordered eating behaviours occurred the day before being weighed, the day of being weighed, or the day after being weighed).

Finally, the open-ended questions were analysed using thematic analysis (Braun & Clarke, 2006) with NVivo 11, following the five main steps of Spencer and Ritchie's (2002) framework method. This included (1) familiarisation with the data, (2) creating a thematic framework, (3) indexing, (4) charting, and (5) mapping and interpretation. To ensure methodological rigour, development of the thematic framework and indexing was done through independent analyses by the first author and an independent coder. Differences in interpretation of data were collaboratively discussed until consensus was reached.

3. Results

3.1. Group equivalence

Preliminary analyses indicated no baseline difference between weighing groups on any variables (Table 1).

3.2. Effect of weighing condition on outcome variables

Table 2 shows the descriptive statistics for each group at Sessions 1 and 6.

3.2.1. Weight-related anxiety

The mixed ANOVA on weight-related anxiety revealed no main effect of session, $F(3.87, 189.80) = 0.35, p = .840, \eta_p^2 = 0.01$, but the condition \times session interaction was significant, $F(3.87, 189.80) = 4.72, p = .001, \eta_p^2 = 0.09$. Furthermore, the shape of the interaction's dose-response curve was linear, $F(1, 49) = 13.50, p = .001, \eta_p^2 = 0.22$ (see Fig. 1). Simple-effects analysis indicated that open-weighed participants were significantly more anxious in Session 6 than in Session 1, 2, 3 or 4 ($p = .032, .001, .012$, and $.046$, respectively). In comparison, blind-weighed participants were significantly less anxious in Session 5 compared to Session 1 ($p = .035$) and in Session 6 compared to Sessions 1 and 2 ($p = .013$ and $.028$, respectively). Furthermore, the two conditions differed significantly in their anxiety ratings in Session 5 ($p = .043$) and Session 6 ($p = .007$).

Table 1
Pre-Experiment Group Means (SD) for Demographic and Outcome Variables.

	Open Weighing $n = 25$ $M (SD)$	Blind Weighing $n = 26$ $M (SD)$	p
Age	19.84 (3.36)	20.50 (4.69)	.568
BMI	21.60 (2.03)	22.15 (2.29)	.370
Drive for Thinness	4.80 (0.65)	4.77 (0.46)	.849
Weight-related Anxiety	39.74 (27.65)	41.06 (28.29)	.866
ED Attitudes and Cognitions	1.95 (1.50)	1.86 (0.99)	.793

Note. BMI: body mass index.

3.2.2. ED attitudes and cognitions

The mixed ANOVA on ED-15 scores indicated no significant main effect of session or interaction between session and condition.

3.2.3. Weight preoccupation and disordered eating behaviours

There were no significant differences between groups (i.e., neither the main effect of condition nor any of the day \times condition interactions were significant). Instead, analyses revealed that both groups experienced increased preoccupation with weight and disordered eating behaviours on weighing days compared to non-weighing days (i.e., a main effect of weighing day), $b = 7.06, SE = 2.49, t(685) = 2.84, p = .005$ and $b = 0.71, SE = 0.29, t(685) = 2.42, p = .016$, respectively). No other predictors were significant.

3.3. Qualitative analyses

Analyses of the responses to the open-ended questions found preoccupation with weight to be a common theme in both groups, with participants ($n_{\text{Blind}} = 14, n_{\text{Open}} = 9$) reflecting on how being weighed regularly increased the frequency of thoughts they had about their weight. For example, one participant in the blind-weighing condition said, "I felt more preoccupied with my weight than normal" and another in the open-weighing condition said, "I found myself much more preoccupied with my weight and appearance".

Despite an increase in weight preoccupation, participants in the blind-weighing group reported that the perceived importance of their weight reduced because of the experiment ($n = 12$). Participants expressed that not knowing their weight for the duration of the study helped them reappraise the importance they had previously given to weight and become more tolerant of weight uncertainty. For example, one participant stated, "I did feel quite nervous not knowing my weight and not being able to weigh myself however I feel that overall, through this study, I've learnt to give less importance to my weight which subsequently makes me feel happier during the day".

In comparison, open-weighed participants reported increased preoccupation with weight-influencing behaviours including food intake, exercise, and unhealthy weight-control behaviours ($n = 19$). For example, one participant said, "I became a lot more conscious of my eating habits and had made adjustments to that from session to session," and another participant said, "I found myself skipping breakfast on days I was weighed, and taking off as many heavy items of clothing before being weighed as possible". Furthermore, open-weighed participants experienced a negative impact on their psychological state as a result of the experiment ($n = 13$). For example, participants described feeling "distressed," "anxious," and "moody," particularly on weighing days. Illustrative quotes for each theme are presented in Table 3.

4. Discussion

Regular weighing is recommended widely for weight management, however it can come at a cost for some individuals. The purpose of the present study was to examine the psychological consequences of blind versus open weighing in women with a high drive for thinness. Consistent with previous clinical research, our results showed that women who were exposed to their weight felt increasingly anxious about being weighed and reported increased urges to engage in weight-controlling behaviours, whereas those who did not see their weight felt less weight-related anxiety over time and reported a reduced focus on weight. Interestingly, both groups reported increased weight preoccupation and engagement in disordered eating behaviours on days that they were weighed. Although this effect was limited to weighing days, it suggests that merely being asked to step on a scale could have negative

Table 2
Group Means (SD) for Sessions 1 and 6.

	Session 1		Session 6	
	OW	BW	OW	BW
Weight-related Anxiety	39.74 ^a (27.65)	41.06 ^b (28.29)	50.42 ^{a,c} (28.47)	28.37 ^{b,c} (27.02)
ED Attitudes and Cognitions	2.02 (1.50)	1.82 (1.01)	1.94 (1.33)	1.37 (1.19)
BMI	21.60 (2.03)	22.15 (2.29)	21.56 (2.03)	22.02 (2.18)

Note. OW: open weighing; BW: blind weighing; BMI: body mass index. Means within a row with the same superscript are significantly different from each other at $p < .5$.

consequences and this possibility should be explored in future studies by including a no weighing condition.

Overall, the results of this study suggest that blind weighing, although not completely benign, is a less distressing and potentially less triggering weighing method than open weighing. Blind weighing lends itself particularly well to situations in which weight feedback to the individual is not required, for example during BMI screenings at school which are used to help monitor national trends or evaluate specific school-based interventions. In particular high school students, a group that is vulnerable to body image disturbances and disordered eating (Forman-Hoffman, 2004; Smolak, 2004) would benefit from not being subjected to seeing their weight. Similarly, regular weighing done in the context of routine antenatal care could be “blind” given the increased vulnerability to the development of body dissatisfaction during pregnancy (Hodgkinson, Smith, & Wittkowski, 2014). In some situations (e.g., when communicating gestational weight gain guidelines), weight feedback may be deemed necessary because the benefits outweigh potential risks. Again, drawing from ED patients’ insights, blind weighing can be adapted to provide some level of weight feedback without risking obsession over a numerical value by disclosing “exact” weight information (Froneich et al. 2020). Examples of modified blind weighing could be using a numberless weight graph (a graph that depicts the weight trend but no specific numbers) or BMI banding (individuals are told when they move up or down a BMI band). Further research investigating the psychological effects of these adaptations compared to exposure to exact weight information is needed to determine their suitability for the general population.

There are some limitations to the present research that should be noted. First, a number of constructs were measured by single-items to keep the assessments brief. Single-items can be psychometrically problematic and, although numerous studies have demonstrated acceptable reliability and validity of single-items (e.g., Abend, Dan,

Maoz, Raz, & Bar-Haim, 2014), future studies should use multi-item scales to further improve the assessment of the constructs studied in this project. Second, the current sample consisted of young, normal-weight females with high DFT, thus results may not be generalisable to individuals from different demographics (e.g., age, BMI, gender). Third, this study explored the effects of being weighed, not self-weighing, which is another very commonly recommended form of weight monitoring. Although regular self-weighing in treatment-seeking adults who are overweight or obese has not been found to negatively impact psychological outcomes (Welsh, Sherwood, VanWormer, Hotop, & Jeffery, 2009; Wing, Tate, Gorin, Raynor, Fava, & Machan, 2007), studies conducted with individuals who are either underweight or normal weight have reported negative effects of self-weighing including anxiety, depression, self-esteem, and body satisfaction (Mercurio & Rima, 2011; Ogden & Whyman, 1997). Future work should investigate whether adapting self-weighing to be “blind” for these subgroups could be beneficial, for example, by using scales that do not display exact weight information and instead give weight feedback through a colour coding system (e.g., green colour signifies weight maintenance, grey weight gain, and blue weight loss).

In summary, the results of this study support the use of blind weighing as an alternative, potentially safer weighing method to open weighing, which could be particularly useful for subgroups of the population that are potentially vulnerable to experiencing negative psychological consequences from weighing. Findings further suggest that weighing of these subgroups, regardless of whether they see the weight or not, can have a negative (albeit transient) impact on weight preoccupation and disordered eating behaviours and this should be considered when deciding whether or not to weigh. This is the first study to experimentally evaluate blind weighing. Future studies conducted with other subgroups (e.g., adolescents, clinical samples, pregnant women) are needed to determine whether these findings are generalisable.

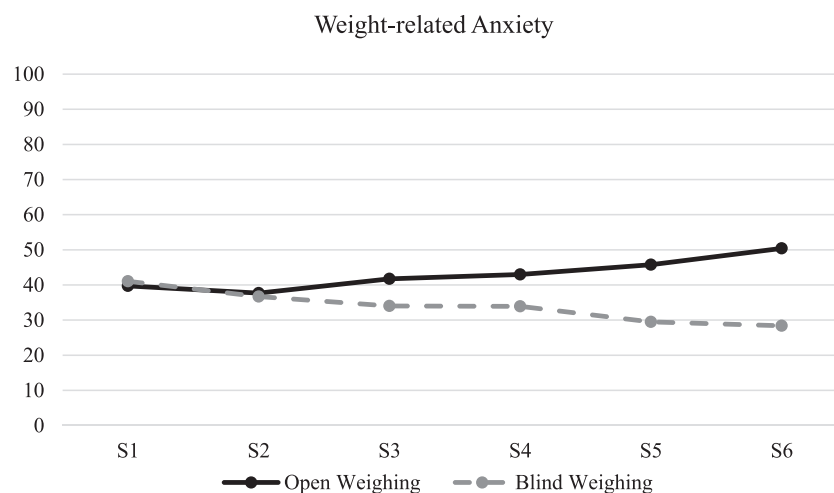


Fig. 1. Weight-related anxiety scores across sessions, by condition.

Table 3
Illustrative Participant Quotations.

Theme		Illustrative participant quotations
Preoccupation with weight	BW	"I think during the study sessions while getting weighed it made me think about my weight more often than I usually would [...]."(BW22)
	OW	"I felt more preoccupied with my weight than normal" (BW16) "My weight consumed me more than I would've liked" (OW39) "I found myself much more preoccupied with my weight and appearance, leading to increased feelings of guilt and shame when I ate certain foods."(OW31)
Importance of weight	BW	"Made me realize weight shouldn't be such a big thing in my life." (BW25) "I did feel quite nervous not knowing my weight and not being able to weigh myself however I feel that overall, through this study, I've learnt to give less importance to my weight which subsequently makes me feel happier during the day."(BW53)
Preoccupation with weight-influencing behaviours	OW	"I found myself skipping breakfast on days I was weighed, and taking off as many heavy items of clothing before being weighed as possible. Due to the bi-weekly weigh-ins, my overall anxiety about my weight increased significantly if my weight was either higher than the previous time, or not significantly lower."(OW2) "I had noticed that as each session had gone by, I became a lot more conscious of my eating habits and had made adjustments to that from session to session." (OW26) "I would find myself eating less or being more restricted in my diet a day or two prior the session." (OW40)
	OW	"I became really anxious, distressed and preoccupied with my weight" (OW3) "Sometimes, I become over-occupied with my weight after the weighing session that I became distressed and moody for the whole day."(OW10) "I found myself feeling anxious when I had increased in weight."(OW20) "I was anxious about weighing sessions" (OW40)

Note. BW: Quotes relating to blind weighing; OW: Quotes relating to open weighing; BW# blind weighed participants; OW#, open weighed participant.

CRedit authorship contribution statement

Franziska Froreich: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Lenny Vartanian:** Conceptualization, Methodology, Writing – review & editing. **Jessica Grisham:** Conceptualization, Methodology, Supervision. **Rebecca Pinkus:** Formal analysis, Writing – review & editing.

Declaration of Competing Interest

None.

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