

WHEN GOOD STUDIES GO BAD: TRIALS AND TRIBULATIONS DURING A STUDY OF WEIGHT STIGMA AND EATING IN THE ABSENCE OF HUNGER

Angela Meadows

Weight stigma

- Stigmatisation and discrimination because of weight
- Practically every domain of daily life
- High prevalence rates across numerous large studies
 - Up to 100% ever experienced
 - 50-70% experience weekly or more often
- On the rise
- Associated with morbidity, mortality, QoL



Andreyeva et al 2008; Hatzenbuehler et al 2009; Puhl & King 2013; Puhl & Suh 2015

Internalised Weight Stigma

- Accept and believe societal anti-fat attitudes and stereotypes leading to self-devaluation
 - Related to but distinct from self-esteem, body image, anti-fat bias
 - No gender differences (cf experienced stigma)
 - Not limited to higher weight individuals
- Reduced HRQoL, independent predictor of physical and mental health impairment
- Avoidant coping, more maladaptive behaviours, disordered eating, fewer health behaviours

Durso & Latner, 2008; Lillis et al, 2011; Latner et al, 2013; Puhl et al, 2007; Schvey & White, 2015; Vartanian & Novak, 2011.

Weight Stigma vs Food Intake

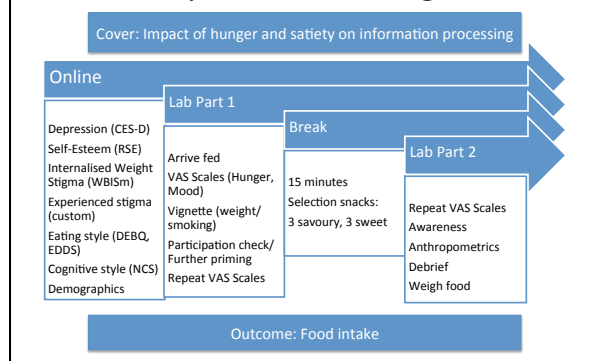
- A lot of cross-sectional studies, but little in the way of experimental
- Schvey et al 2011
 - 34 OW, 39 NW females, fasted
 - Watched weight-stigmatising or neutral video then access to snack foods
 - OW stigma group ate 3X kcal vs OW neutral, significantly more than NW women in either condition
- Major et al 2014
 - 93 fasted female UGs
 - Read article on impact of weight/smoking on employment then discuss while being taped
 - Self-perceived OW in stigma condition ate most; no effect actual BMI
- Both fasted, neither measured internalised stigma

Eating in the Absence of Hunger

- Measure of non-physiological energy intake
- Two stages:
 - (1) Eat to satiety;
 - (2) Break with access to snack foods
- Stress manipulation experiments in adults:
 - Stress increases EAH in NW and OW adults
 - Effect higher in OW
 - No gender differences in EAH
 - Possible more ego-threatening stressor would create gender differences

Fisher & Birch, 2002; Lemmens et al, 2011; Rutters et al, 2009.

Experimental Design



Vignettes

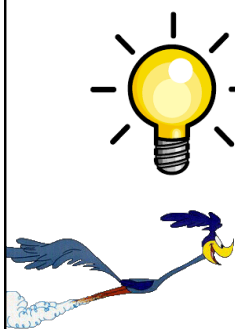
- Designed to prime personal cost without confounding health, economic factors etc
- “Newspaper article on relationship issues”
 - Based on actual research on lower desirability of higher weight individuals
 - Potential and current relationships
- Control vignette replaced all weight-related words with smoking-related words

Recruitment plan 1

- Target sample: higher-weight male and female participants
 - University channels
 - Social media (local area; weight-related)



Recruitment plan 2



- IWS not limited to higher-weight BMI
- Target sample: STUDENTS

Analysis part 1 (presented previously)

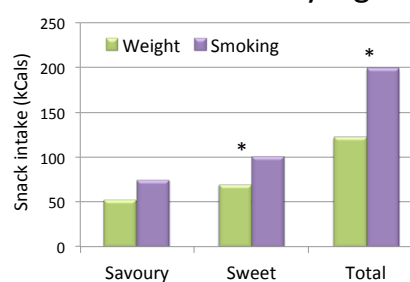
- No differences in demographics or anthropometric measures between experimental groups
 - 94% female, 86% white, age 19.2 years
 - Mean BMI 21.6 (SD 3.3)
 - Objective measure: 12.5% UW, 75.0% NW, 10.2% OW, 2.3% OB
 - Self-classified: 3% UW, 76% NW, 21% OW (a little/moderately/very)
- Only 4.4% (n=4) experienced any weight stigma/discrimination
- No differences in depression, self-esteem, IWS, DEBQ, EDDS symptoms scores, NCS, or baseline hunger or anxiety scores between experimental groups

Correlates of IWS

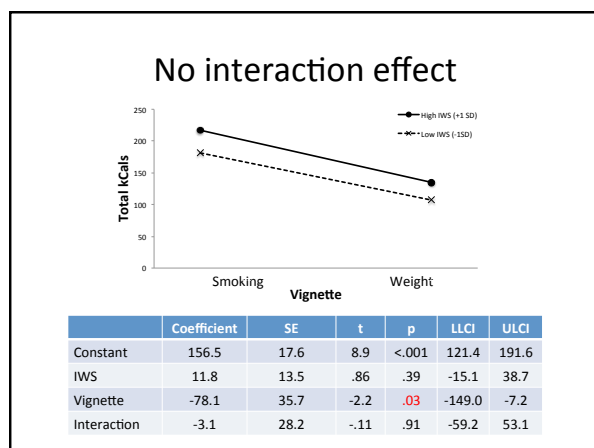
	<i>r</i>	<i>p</i>
Depression (CES-D)	.342	.001
Self-esteem (RSE)	-.585	<.001
DEBQ-Restraint	.617	<.001
DEBQ-External	-.195	.065
DEBQ-Emotional	.005	.962
BMI	.487	<.001
Self-classified weight	.526	<.001
Dieting status	-.538	<.001
Experienced stigma	.227	.031

No correlation with age, gender, or skipping meals

Snack intake by vignette



- No differences in hunger levels between the groups at T1 or T2
- Same pattern observed for intake of fat grams



IWS not a moderator?

	Effect	SE	t	p	LLCI	ULCI
-1 SD	-74.0	40.6	-1.82	.07	-154.8	6.8
Mean	-78.1	35.7	-2.2	.03	-149.0	-7.2
+1 SD	-82.2	61.0	-1.4	.18	-203.6	39.1

- Effect of vignette on intake negative at all values IWS
- As IWS increases, intake decreases slightly
- Doesn't reach significance for higher values IWS
- But note, mean = 2.9 (scale 1 to 7); median 2.6; 85% have values below 4.5

Thoughts

- Main effect for vignette
 - Distancing from 'fat people'? Fear of fat?
- No apparent moderating effect for IWS
 - But sample doesn't provide wide range and very positively skewed
 - Different in heavier population?

Recruitment plan 1 revisited

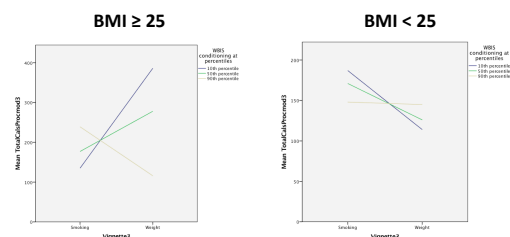
- Target sample: higher-weight male and female participants
 - University channels
 - Social media (local area; weight-related)
 - More social media
 - Begging (aka snowball sampling)



Analysis part 2

- N=50 community participants
- OK to combine with student sample?
 - Recruitment group not a significant predictor of main study outcomes (IWS, food intake), after controlling for BMI category, age, sex.
- New sample, N=140

Pretty pictures, but not significant



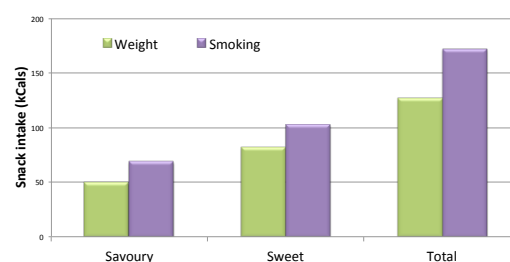
No sig effect for vignette, IWS, BMI category, or 2-way interactions.
3-way interaction: $B = -108$ (95% CI -219, 2), $SE = 56$, $t = -1.9$, $p = .055$

Recruitment plan 1 – Extreme edition

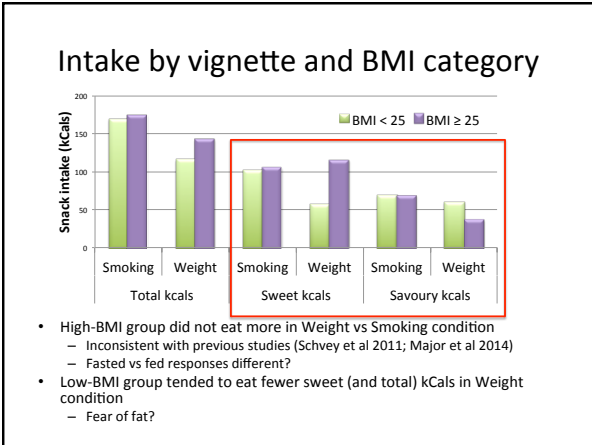
- High-intensity recruitment of higher-weight male and female participants
 - University channels
 - Social media (local area; weight-related)
 - More social media
 - A *lot* of begging
- Now: N = 75 community participants



Snack intake by vignette



- Same pattern as for student-only sample, but all non-significant.

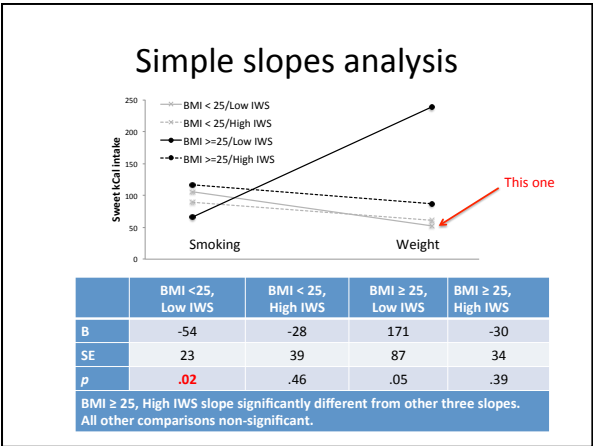
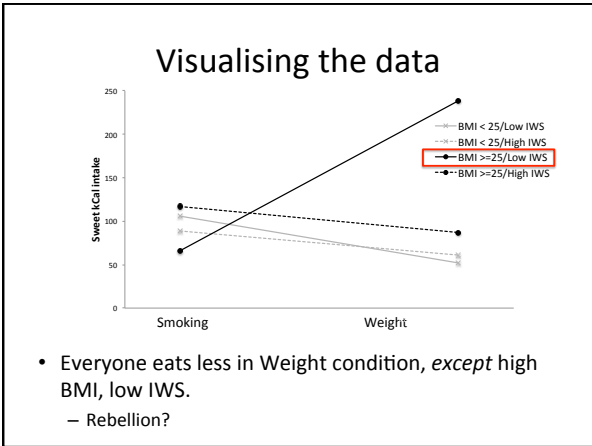


Sweet kCal intake

	B	SE	LLCI	ULCI	p
Constant	100	13	74	125	< .001
Vignette	10	26	-41	61	.706
Internalised weight stigma	-9	8	-25	8	.314
BMI category	50	32	-13	112	.119
Vignette*IWS	-27	16	-59	5	.098
Vignette*BMI category	112	54	5	219	.041
IWS*BMI category	-15	18	-50	20	.386
Vignette*IWS*BMI category	-79	34	-146	-13	.019
Sex	-19	13	-45	7	.150
Baseline hunger	41	11	19	62	< .001

Model R² = .21; Change in R² due to 3-way interaction = .04

- Only baseline hunger significant in model for savoury kcals
- Total Kcals similar to sweet Kcals, but absolute intake values boosted by addition of savoury



The source of the problem

	N	%	Smoking	Weight
High BMI, High IWS	48	30.4	23 (47.9%)	25 (52.1%)
High BMI, Low IWS	24	15.2	15 (62.5%)	9 (37.5%)
Low BMI, High IWS	24	15.2	12 (50.0%)	12 (50.0%)
Low BMI, Low IWS	62	39.2	30 (48.4%)	32 (51.6%)
Total	158		80 (50.6%)	78 (49.4%)

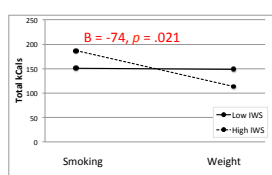
- Naturally lower N for some combinations of BMI and IWS
- Uneven distribution by condition in high BMI/low IWS category
- Large SEs -> unexpected simple slopes findings
- Overall, underpowered and unreliable
- G*Power -> N = 128 for medium effect size, but assumes groups same size, and DV normal with equal variance in each

Just give me a moment ...

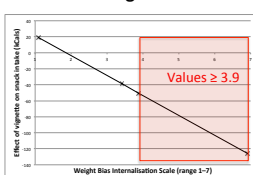


All is not lost: testing a simpler moderation model

Snack intake at ± 1 SD



Zone of significance



- Baseline hunger, sex, BMI category included as covariates
- Hunger only significant predictor
- But conditional effect significant at higher levels of IWS

Where to now?

- First ...



Making sense of it all (1)

- Overall, people tended to eat fewer snack calories when exposed to weight stigma
- Inconsistent with previous EAH studies: high-BMI ate more in stress condition
 - Is this related to the nature of the stressor (neutral versus ego-threat)?

Making sense of it all (2)

- But also inconsistent with previous stigma manipulation studies: high-BMI ate more in stress (Weight) condition
 - Previous studies used fasted participants;
 - Is there a difference for eating when hungry and not being able to stop, versus snacking (no need to start)?
 - But no difference in those who ate/didn't eat by condition
 - Apart from the high BMI-low IWS category, among the other BMI-IWS combinations, ≈ 85% ate something in the Smoking condition vs ≈ 65% in the Weight condition
 - Impressions management? Eat more when leave? But why different in this study?

And last, but not least ...

- The reduced intake effect is most pronounced in individuals with higher IWS
- Disturbing real-world implications
- “Shaming” public health policy controversial and most evidence suggests ineffective
- EWS and IWS linked to plethora of negative health and behavioural outcomes
- No shortage of calls for *more* stigma
- Argh!

Puhl et al 2013, Vaala et al 2016; Vartanian & Smyth 2013.

Andreyeva, Puhl & Brownell (2008). Changes in perceived weight discrimination among Americans, 1995-1996 through 2004-2006. *Obesity*, 16: 1129-1134.

Durso & Latner (2008). Understanding self-directed stigma: Development of the Weight Bias Internalization Scale. *Obesity*, 16: S80-S86.

Fisher & Birch (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *Am J Clin Nutr*, 76: 226-231.

Hatzenbuehler, Keyes & Hasin (2009). Associations between perceived weight discrimination and the prevalence of psychiatric disorders in the general population. *Obesity*, 17: 2033-2039.

Latner, Durso & Mond (2013). Health and health-related quality of life among treatment-seeking overweight and obese adults: Associations with internalized weight bias. *J Eat Disord*, 1: 3.

Lemmens, Rutters, Born & Westerterp-Plantenga (2011). Stress augments food 'wanting' and energy intake in visceral overweight subjects in the absence of hunger. *Physiol Behav*, 103: 157-163.

Lillo, Levin & Hayes (2011). Exploring the relationship between BMI and health-related quality of life: A pilot study of the impact of weight stigma and experiential avoidance. *J Health Psychol*, 16: 722-727.

Majur, Hunger, Bunyan & Miller (2014). The ironic effects of weight stigma. *J Exp Soc Psychol*, 51: 74-80.

Puhl & King (2013). Weight discrimination and bullying. *Best Pract Res Clin Endocrin Metab*, 27: 117-127.

Puhl & Suh (2015). Health consequences of weight stigma: Implications for obesity prevention and treatment. *Curr Obes Rep*, 4: 182-190.

Puhl, Moss-Racusin & Schwartz (2007). Internalization of weight bias: Implications for binge eating and emotional well-being. *Obesity*, 15: 19-21.

Puhl, Luedicke & Peterson (2013). Public reactions to obesity-related health campaigns: a randomized controlled trial. *Am J Prev Med*, 45: 36-48.

Rutters, Nieuwenhuizen, Lemmens, Born & Westerterp-Plantenga (2009). Acute stress-related changes in eating in the absence of hunger. *Obesity*, 17: 72-77.

Schrey & White (2015). The internalization of weight bias is associated with severe eating pathology among lean individuals. *Eat Behav*, 17: 1-5.

Schrey, Puhl & Brownell (2011). The impact of weight stigma on caloric consumption. *Obesity*, 19: 1857-1862.

Sutin, Stephan & Terracciano (2015). Weight discrimination and risk of mortality. *Psychol Sci*, 26: 1803-1811.

Vaala, Bleakley, Hennessy & Jordan (2016). Weight stigmatization moderates the effects of sugar-sweetened beverage-related PSAs among US parents. *Media Psychol*, 19: 534-560.

Vartanian & Novak (2011). Internalized societal attitudes moderate the impact of weight stigma on avoidance of exercise. *Obesity*, 19: 752-762.

Vartanian & Smyth (2013). *Primus non nocere*: Obesity stigma and public health. *Bioeth inq*, 10: 49.