

The Ensemble-Building Challenge for Fashion Recommendation:

Investigation of In-home Practices and Assessment of
Garment Combinations

Jingwen Zhang, Loren Terveen, and Lucy E. Dunne

University of Minnesota

I have nothing to wear!

Hypothetical woman's closet of 120 items:

- 15 dresses
- 25 bottoms (pants/skirts)
- 30 tops
- 30 sweaters
- 20 jackets

Total outfits?

$$25 * 30 * 30 * 20 + 15 = \mathbf{675,015}$$

... nothing?

Understanding Outfits

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graph TD; A[Understanding Outfits] --> B([Self-reported objectives and challenges]); A --> C([Self-reported strategies]); A --> D([Assessment of auto-generated outfits]);
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Self-reported
objectives and
challenges

Self-reported
strategies

Assessment of
auto-generated
outfits

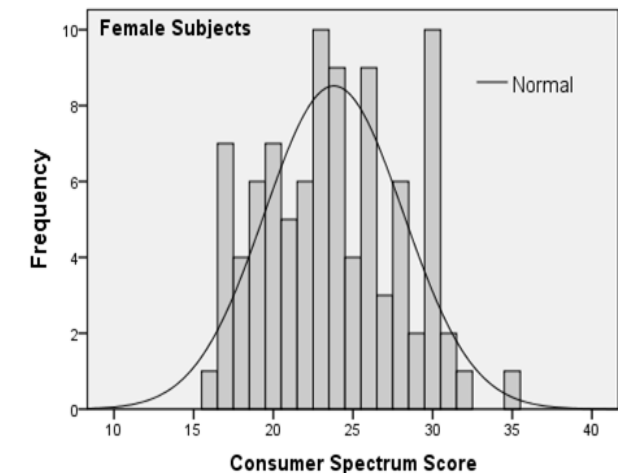
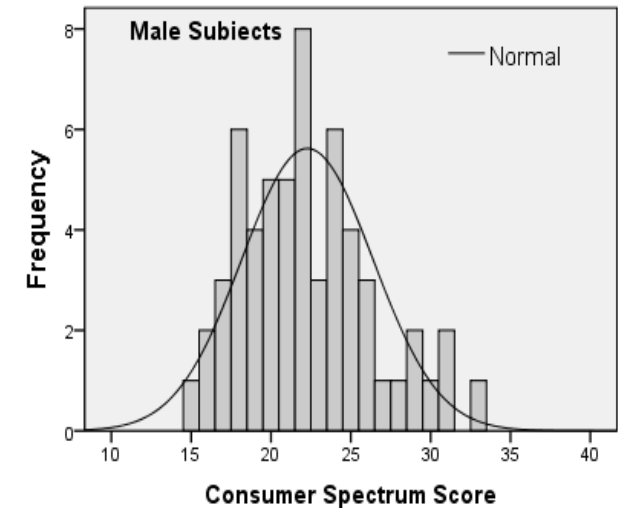
Self-report: User survey

194 MTurk workers, 18-63 yrs old, 128 female/66 male

“Consumer spectrum score” calculated from a 9-question battery

Survey topics:

- (1) Perceived wardrobe size and use
- (2) Values and objectives in dressing
- (3) Constraints of the wardrobe moment
- (4) Variables at play in the dressing decision
- (5) Outfit-building strategies



Results: Wardrobe Size

Larger wardrobes for female vs. male participants

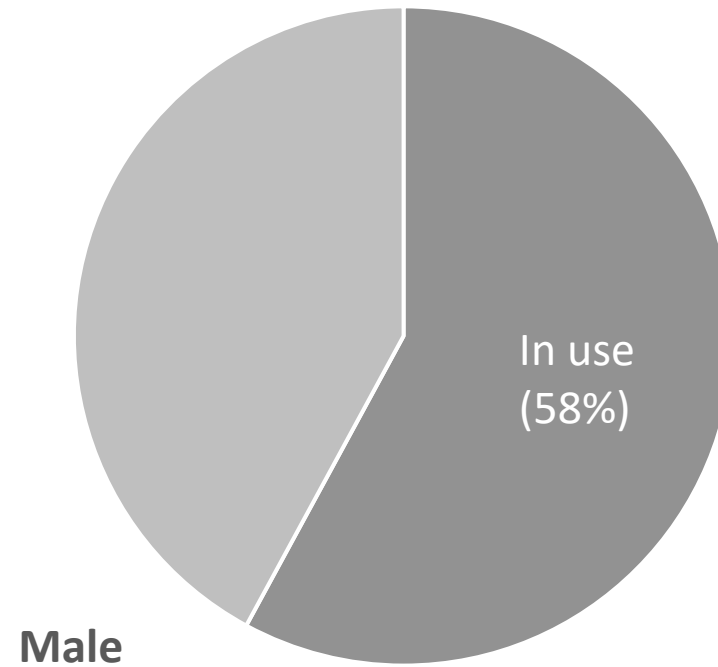
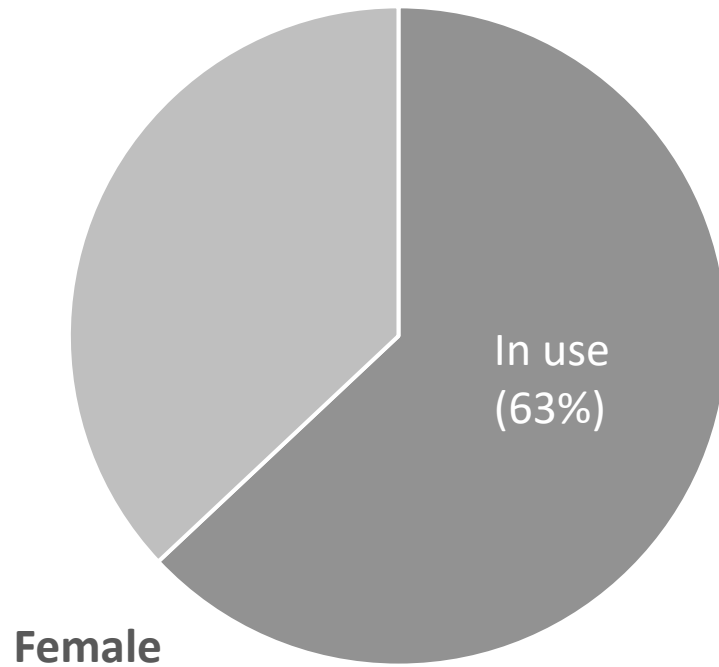
Slightly larger wardrobes when estimated by sub-category



No strong relationships between wardrobe size and consumer spectrum score

Results: Wardrobe Use

Percent of working wardrobe in “regular use”

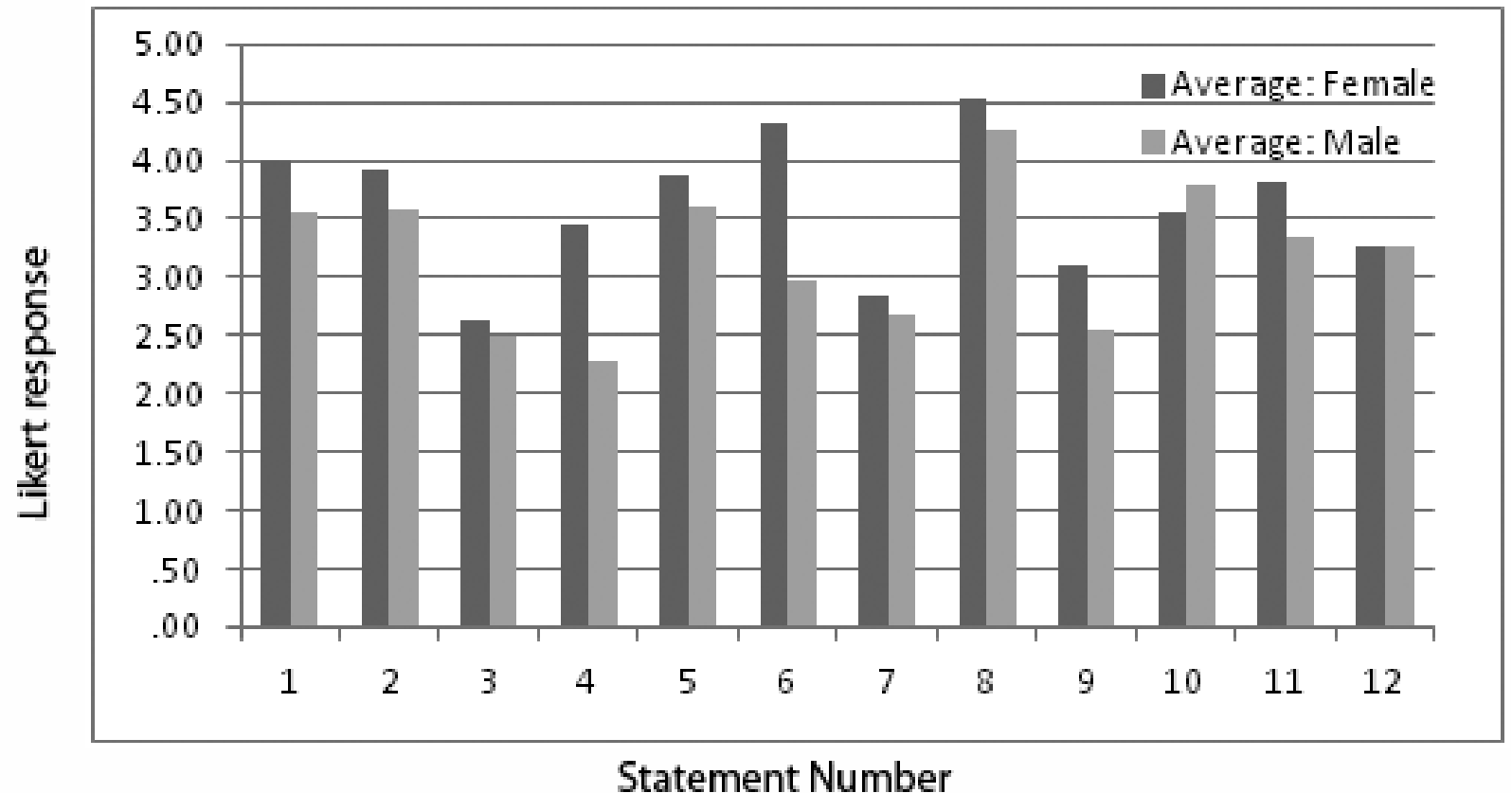


Objectives in Dressing

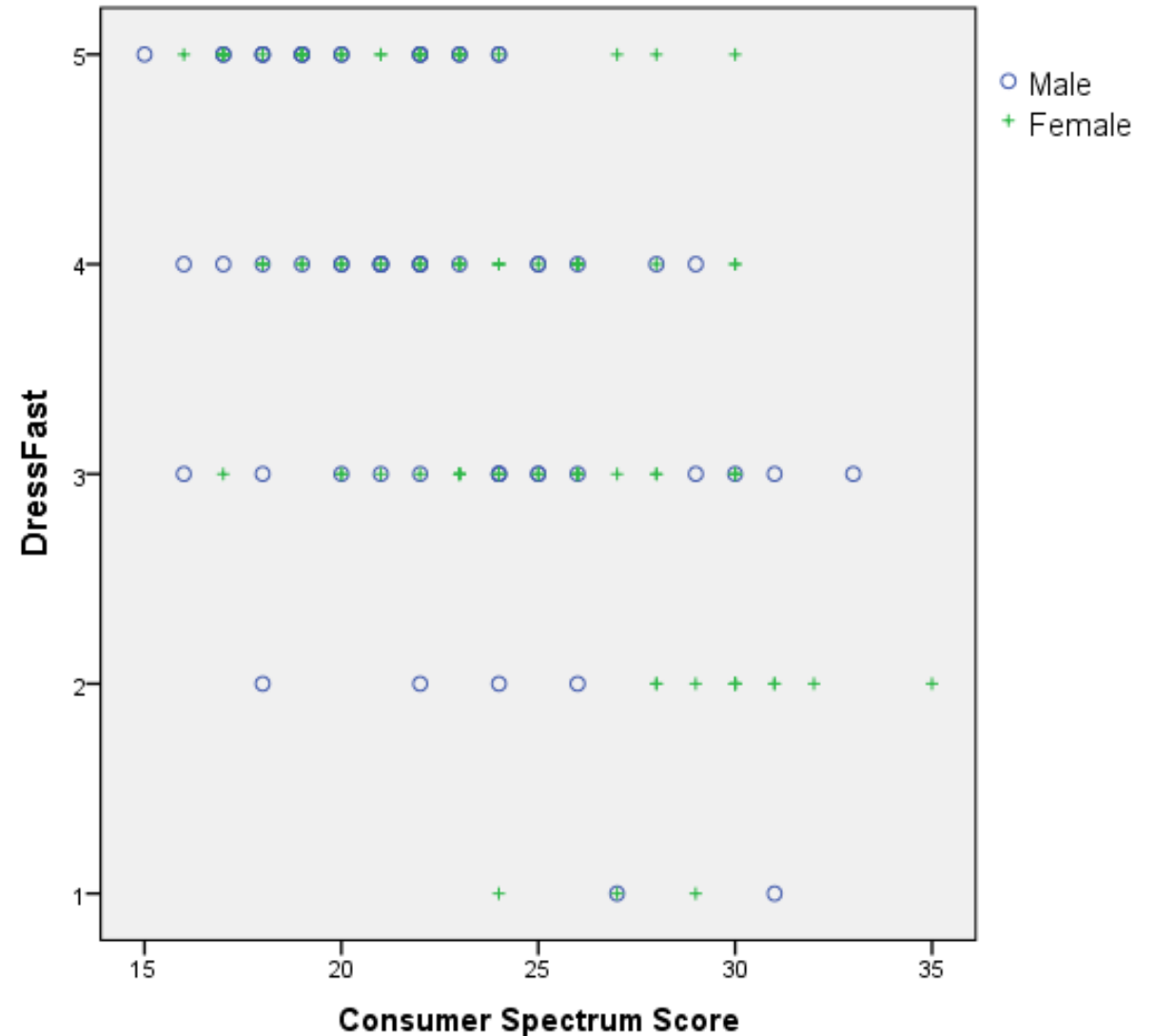
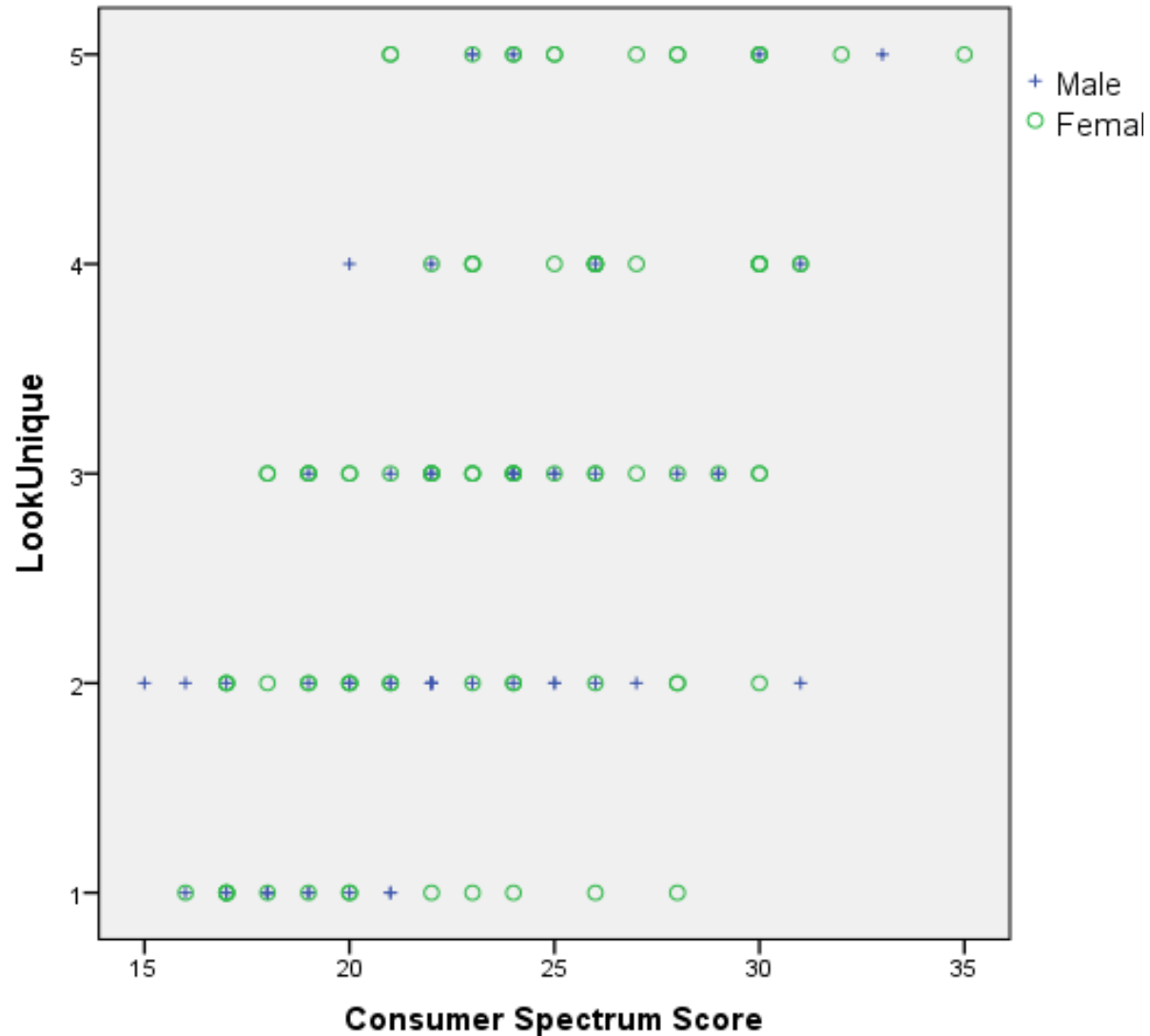
1. I want to look my best or improve the way I look
2. I want to make use of everything I own and waste as little as possible
3. I want to look trendy and keep up with current fashion
4. I want to have fun putting together outfits, be creative, and express myself
5. I want to fit in and look appropriate every day
6. I want to dress to flatter my body
7. I want to reduce my consumption of clothing
8. I want to be comfortable (physically) in my clothes every day
9. I want to look unique and different in the way I dress
10. I want to get dressed as quickly as possible
11. I want to spend less money on clothing
12. I want to do laundry less often

Results: Objectives in Dressing

1. Look my best
2. Make use of everything
3. Look trendy
4. Have fun
5. Fit in and look appropriate
6. Flatter my body
7. Reduce consumption
8. Be comfortable
9. Look unique
10. Dress quickly
11. Spend less money
12. Do laundry less often



Results: Objectives in Dressing



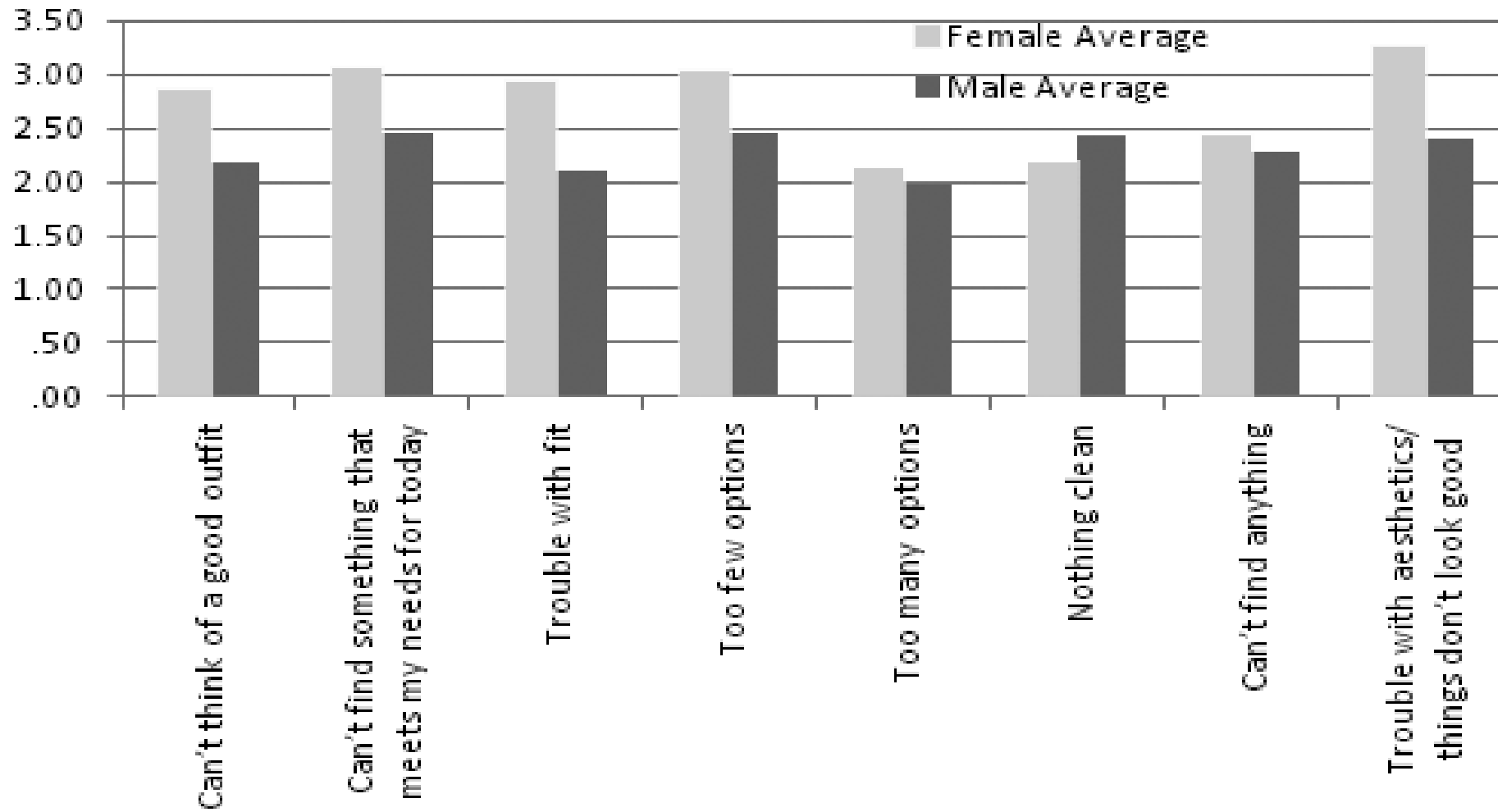
The Wardrobe Moment

Male participants: 61.54% spend less than 5 min dressing, 95.39% less than 10 min

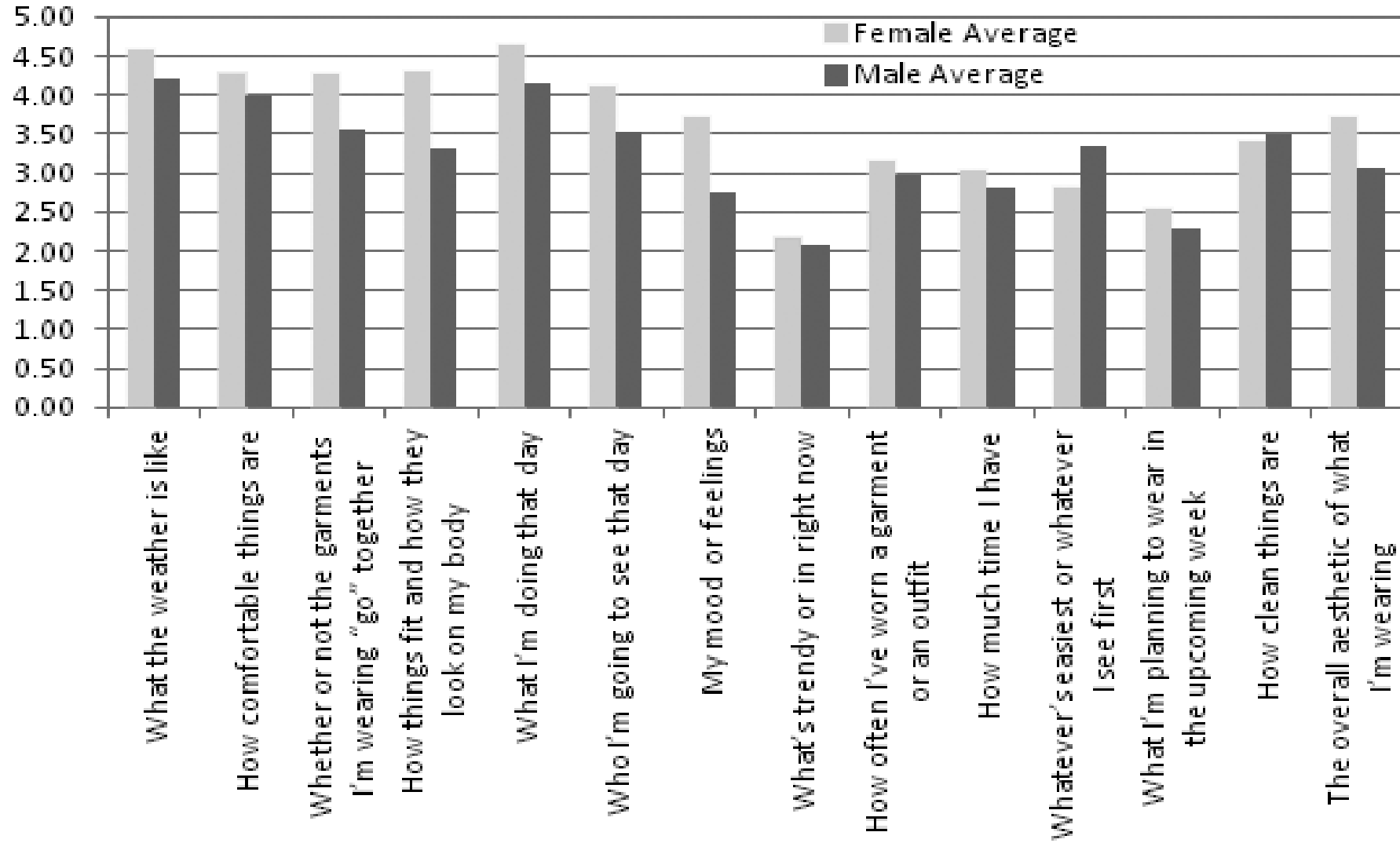
Female participants: 42.97% spend less than 5 min, 80.47% less than 10 min

For a “special day”, 38.46% male/60.94% female spend more than 10 min

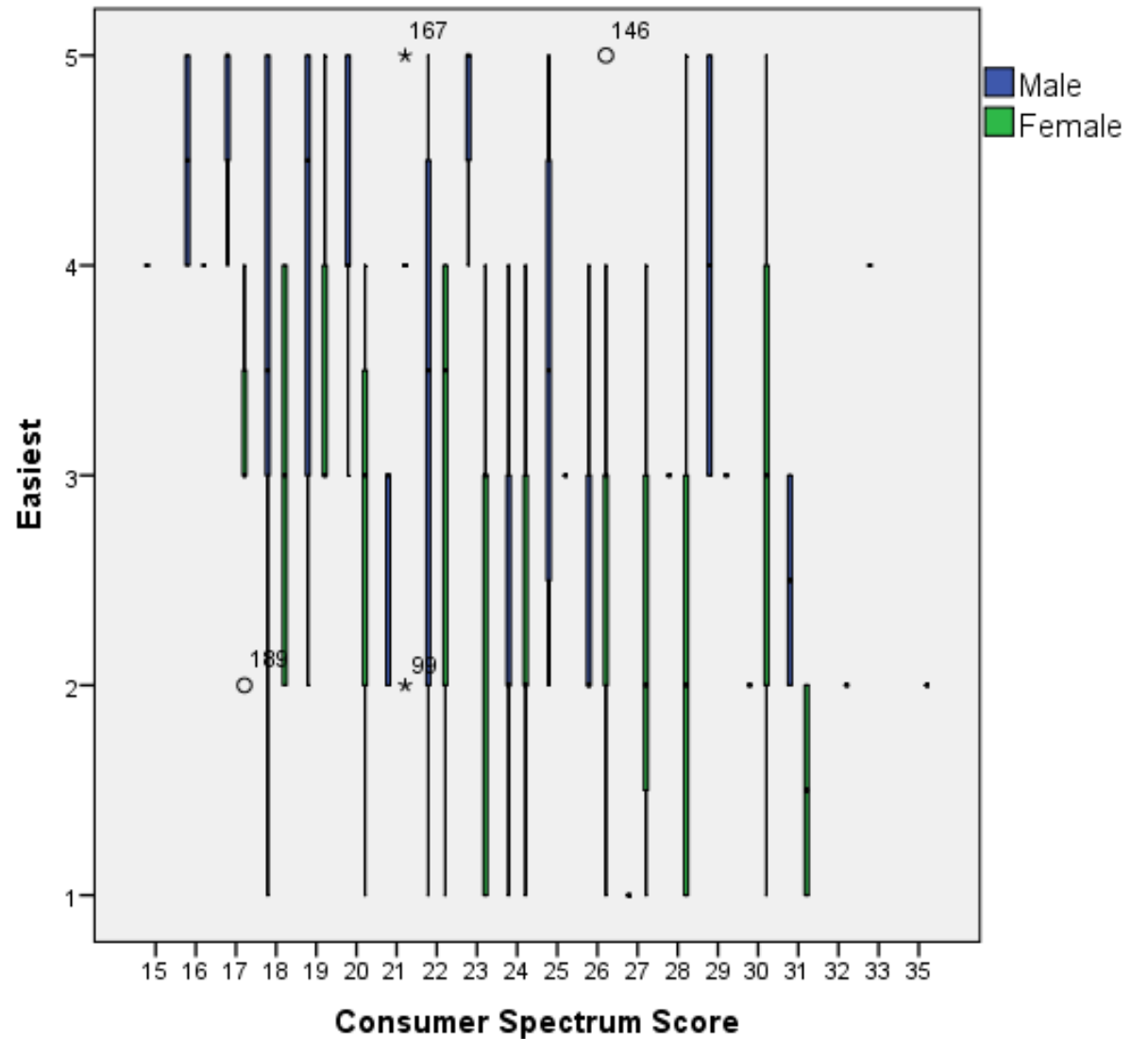
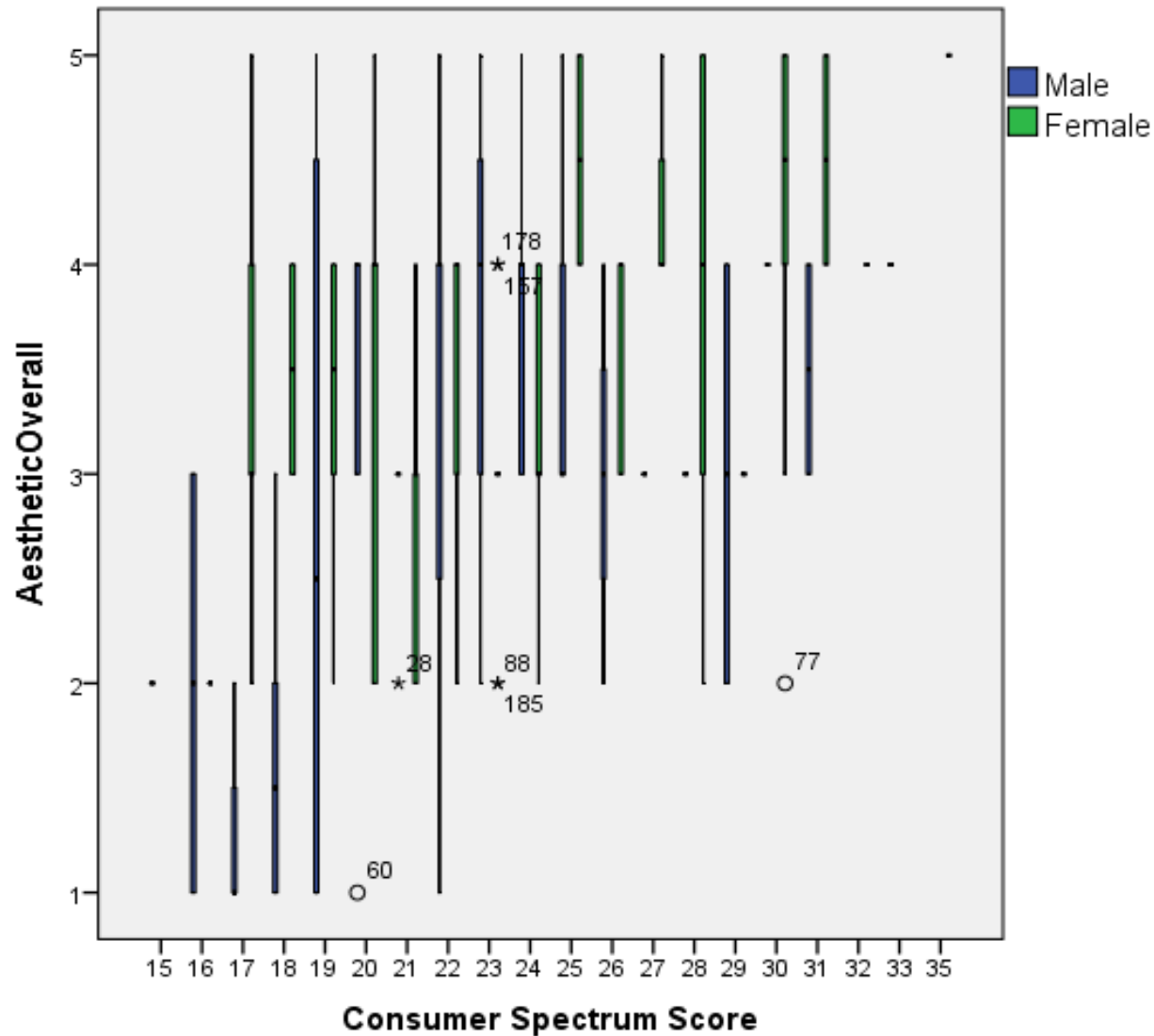
Sources of Difficulty in Dressing



Strategies in Dressing

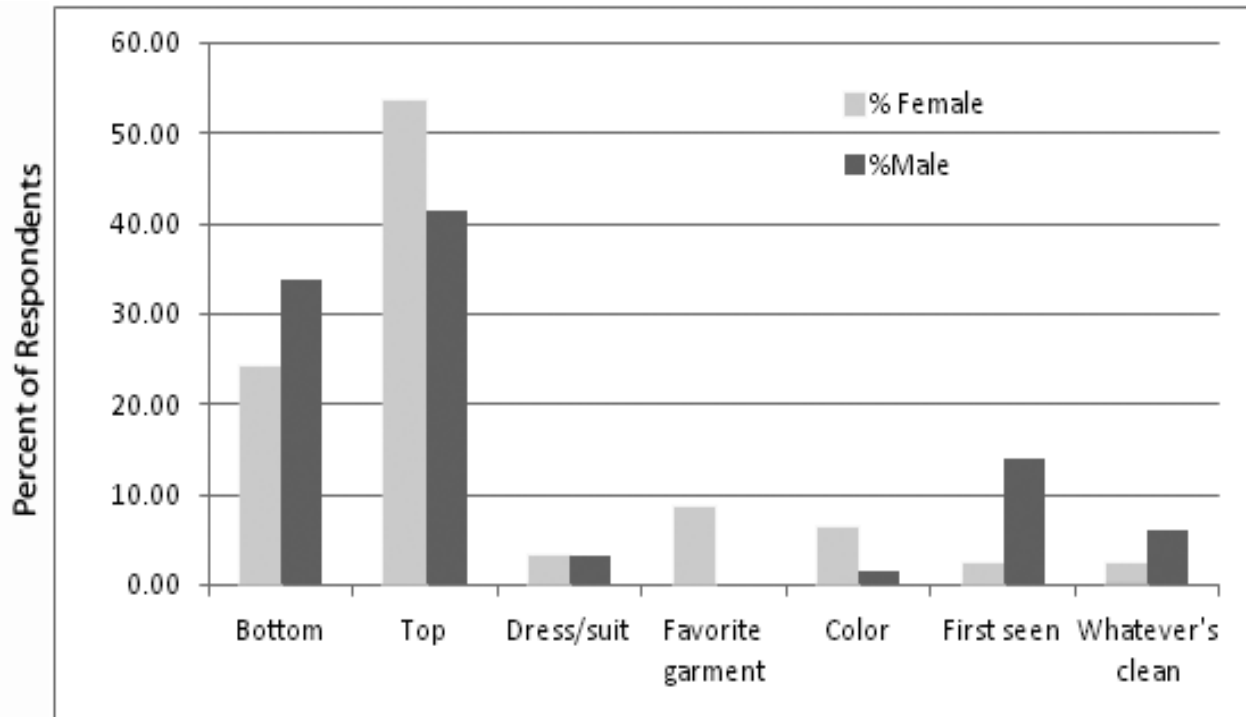


Strategies in Dressing



Strategies in Dressing: Outfit-Building

Starting point for outfit-building: pick a garment



Use a constraint: weather, activity, what's clean

Make an emotional choice: what color do you feel like today?

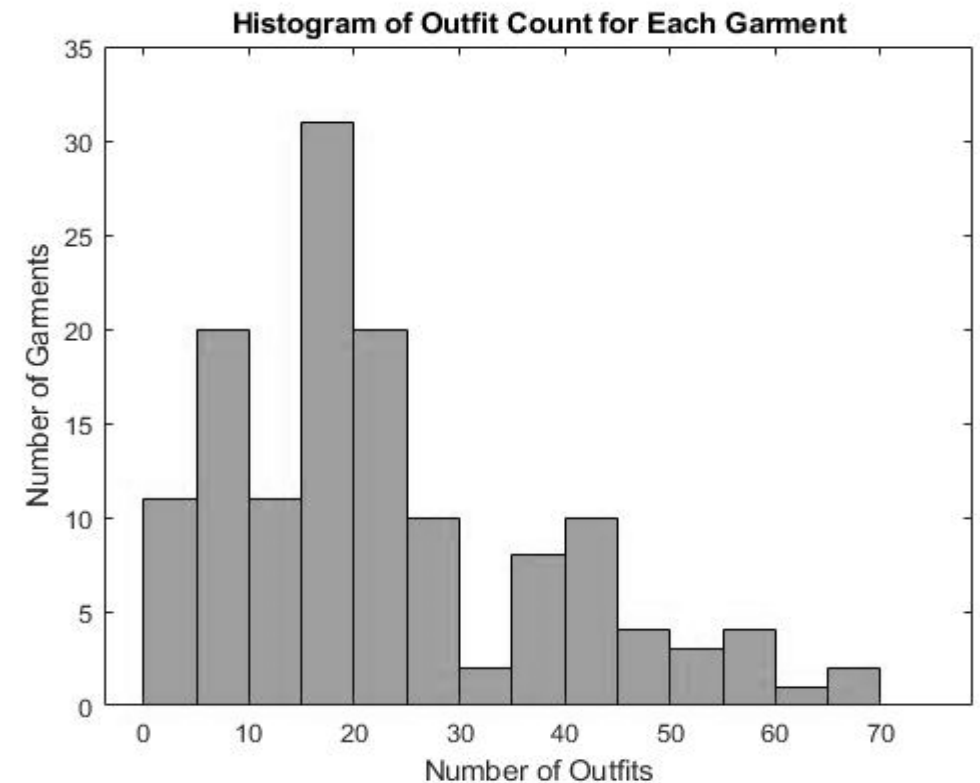
Evaluating Outfits

Test Wardrobe and Outfits

137-item wardrobe: 77 tops, 10 bottoms, 10 dresses, and 5 jackets

Tops categorized in 3 layers (inner, middle, outer)

491,185 one- to three-layer outfits generated



Rating Outfits

Random sample of 1000 outfits extracted, rated on a 5-point scale:

5: This is a great outfit; I can imagine someone looking good wearing exactly this.

4: This is an ok outfit. It might have some style problems, or it might be a little bland, but it's wearable.

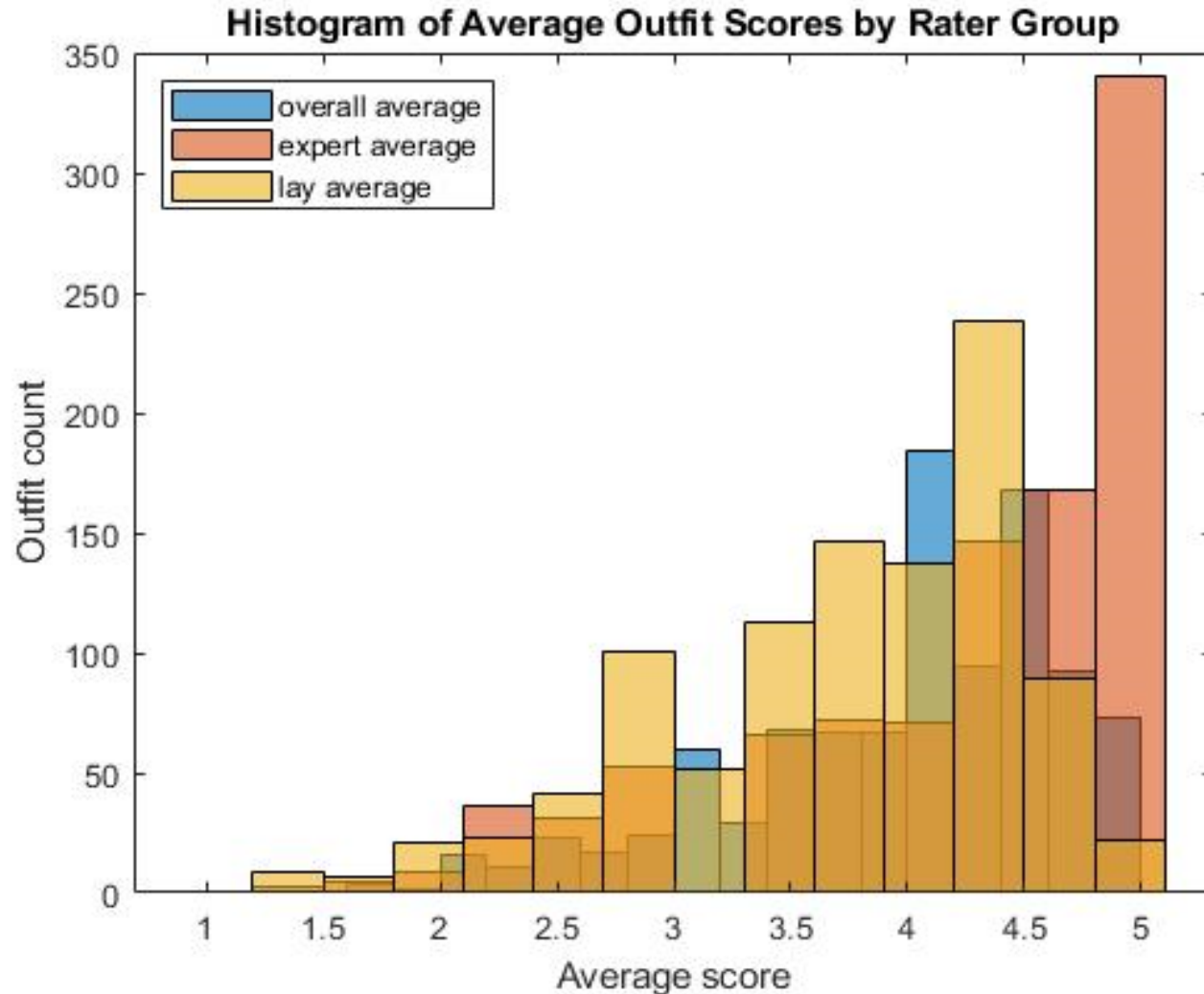
3. This is a wearable outfit, but it has some problems. These garments could technically be worn together, but the outfit doesn't work very well.

2: This outfit has serious problems, it would be hard to imagine someone wearing it, but a few people might.

1: This outfit is not wearable; I can't imagine anyone wearing it in public.

Each outfit rated by 3 “expert” members of the research team, plus 2-4 crowdsourced raters

Results: Rating Outfits



Outfit Rating	All Raters	Expert Raters	Lay Raters
>=3 (Could technically be worn together)	90.1%	91.6%	86.0%
>=4 (An "ok" outfit)	61.0%	72.5%	48.6%
=5 (A "great" outfit)	1.2%	34.0%	2.2%

Conclusions

Individuals self-report smaller wardrobes that are in more regular use than other evidence indicates

The “wardrobe moment” is a short-term (~5 min) interaction, decisions are constrained by dressing objectives as well as practical considerations

Objectives and strategies in dressing vary across individuals, some variables are linked to position on the consumer spectrum. There is more consistency in goals like wanting to be comfortable, look better, and use the wardrobe efficiently.

Recommending an outfit should take into account practical considerations like weather and activity as well as subjective factors like comfort and social appropriateness. Trendiness was not prioritized.

Individuals are unlikely to perceive having “too many options” as a source of difficulty in dressing, yet they have trouble finding “good” options and the vast majority of garment combinations make wearable outfits. Further research is needed to measure and predict outfit quality for a specific user.

LDunne@umn.edu
@lucyedunne
@outfitauthority
wtl.umn.edu

Thanks! Questions?