

GENDER-BASED ANALYSIS FOR VARIABLE SELECTION IN LOGISTIC MODEL BUILDING

WGH 2016 Teaching Example

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INSTRUCTIONS FOR INSTRUCTOR INCLUDED ON EACH SLIDE:

- General instructions included in purple.
- *Spoken instructions included in blue italics.*

Research Question: *What is the effect of body image concerns on BMI?*

What other factors do we think we might need to test for as potential confounders or effect measure modifiers?

What do we know from the literature?

DEFINITIONS

- Body image concerns include concerns about one's weight or shape. Examples include: feeling fat, worrying about being fat, wanting to be thin, wanting to be muscular.

INSTRUCTIONS FOR INSTRUCTOR:

- Ask class what factors they think should be included. Students may engage by shouting out a variety of answers or by not responding. In either case:
- *Since we are not sure the best set of variables related to body image concerns to predict BMI, we can use a stepwise model to test each one.*

INSTRUCTIONS FOR INSTRUCTOR:

- Instructor continues with standard lecture on automatic selection models.
- Instructor introduces concept of forced variables.
- *Additionally, we have the opportunity to force certain variables to be included in all models at each step.*

Research Article

Sexual Orientation Disparities in BMI among US Adolescents and Young Adults in Three Race/Ethnicity Groups

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INSTRUCTIONS FOR INSTRUCTOR:

- Highlight research from HSPH on BMI differences by age, sexual orientation, and race/ethnicity



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Patterns of Body Image Concerns and Disordered Weight- and Shape-Related Behaviors in Heterosexual and Sexual Minority Adolescent Males

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INSTRUCTIONS FOR INSTRUCTOR:

- Highlight research from HSPH on body image concern differences by age, sex, and sexual orientation

Forced Variables in Model

- Age
- Sex/Gender
- Sexual Orientation
- Race/Ethnicity

How was this collected? Do we know if it refers to biological sex or gender norms?

Were these data collected? How would the absence of these data influence interpretation?

INSTRUCTIONS FOR INSTRUCTOR:

- *There are both theoretical and empirical motivations for including certain required variables in our model, such as age, sex, sexual orientation, and race/ethnicity. All of these factors may be of interest due to their allegedly innate biological differences (for example, what we consider biological sex) or due to the associated culture-bound conventions about norms and relationships (for example, what we consider gender).*
- *Our exposure of interest is body image concerns, which are at least partly formed by social influences. Unfortunately, in our research we often do not have a clear conceptual model for considering both biological and social constructs simultaneously so we must do our best to interpret models with the variables we have.*

Sample Data: Body Concerns & BMI

Variable Guide

- Outcome: bmi = 1 if ≥ 25 , bmi = 0 if < 25
- Covariates (all dichotomized):
 - muscle = concerns about muscularity
 - lean = concerns about leanness
 - diet = past-year dieting behavior
 - binge = past-year binge behavior
 - purge = past-year purge behavior
 - product use of muscle-building product

In Stata:

INSTRUCTIONS FOR INSTRUCTOR:

- *Our data often suffer from the limitations of the dataset. In this case, there were not sufficient numbers to measure racial/ethnic differences so we are not able to include it as a variable in our model; however, we do include the other variables identified.*

Sample Data: Body Concerns & BMI

```
. stepwise, pe(.15) lockterm1: logistic bmi (age sex orient) muscle lean diet  
binge purge product
```

```
begin with term 1 model
```

```
p = 0.0004 < 0.1500 adding lean
```

```
p = 0.0116 < 0.1500 adding purge
```

```
Logistic regression
```

```
Number of obs = 420
```

```
LR chi2(4) = 43.61
```

```
Prob > chi2 = 0.0000
```

```
Pseudo R2 = 0.0780
```

```
Log likelihood = -257.77553
```

bmi	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
age	1.055147	.0134867	4.20	0.000	1.029042	1.081914
sex	1.563375	.3369467	2.07	0.038	1.024726	2.385165
orient	1.055147	.0134867	4.20	0.000	1.029042	1.081914
lean	1.712437	.2511219	3.67	0.000	1.284663	2.282652
purge	1.901285	.4841497	2.52	0.012	1.154235	3.131844

Interpretation

- After adjusting for age, sex, and sexual orientation:
 - 1.71 times greater odds of high BMI among those who were lean-concerned versus those who were not
 - 1.90 times greater odds of high BMI among those who had purging behaviors in the past year versus those who were not

Do we have any concerns with these data?

INSTRUCTIONS FOR INSTRUCTOR:

- Make clear that variables “forced” into these models typically warrant testing for effect measure modification; this sets up the next section on the chunk test for interactions.

Interpretation

- What about effect measure modification and interaction effects?
 - **Effect modification:** How might gender norms differentially modify the relationship between purging behaviors and high BMI?
 - **Interaction effects:** How might concerns about leanness vary by stereotypes for sexual orientation?

INSTRUCTIONS FOR INSTRUCTOR:

- If time permits, instructor is set up to introduce the context for interactions: *We also want to consider interactions. Again, there are both theoretical and empirical motivations for doing so. Prior research has demonstrated interaction effects for body image concerns and for BMI. Theoretically, intersectionality refers to the idea that for individuals who experience multiple dimensions of inequity, the effects may not simply be an additive sum of independent effects but is instead how these dimensions may interact simultaneously to shape and influence human experiences.*