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## Fertility, Belief, and Sexuality

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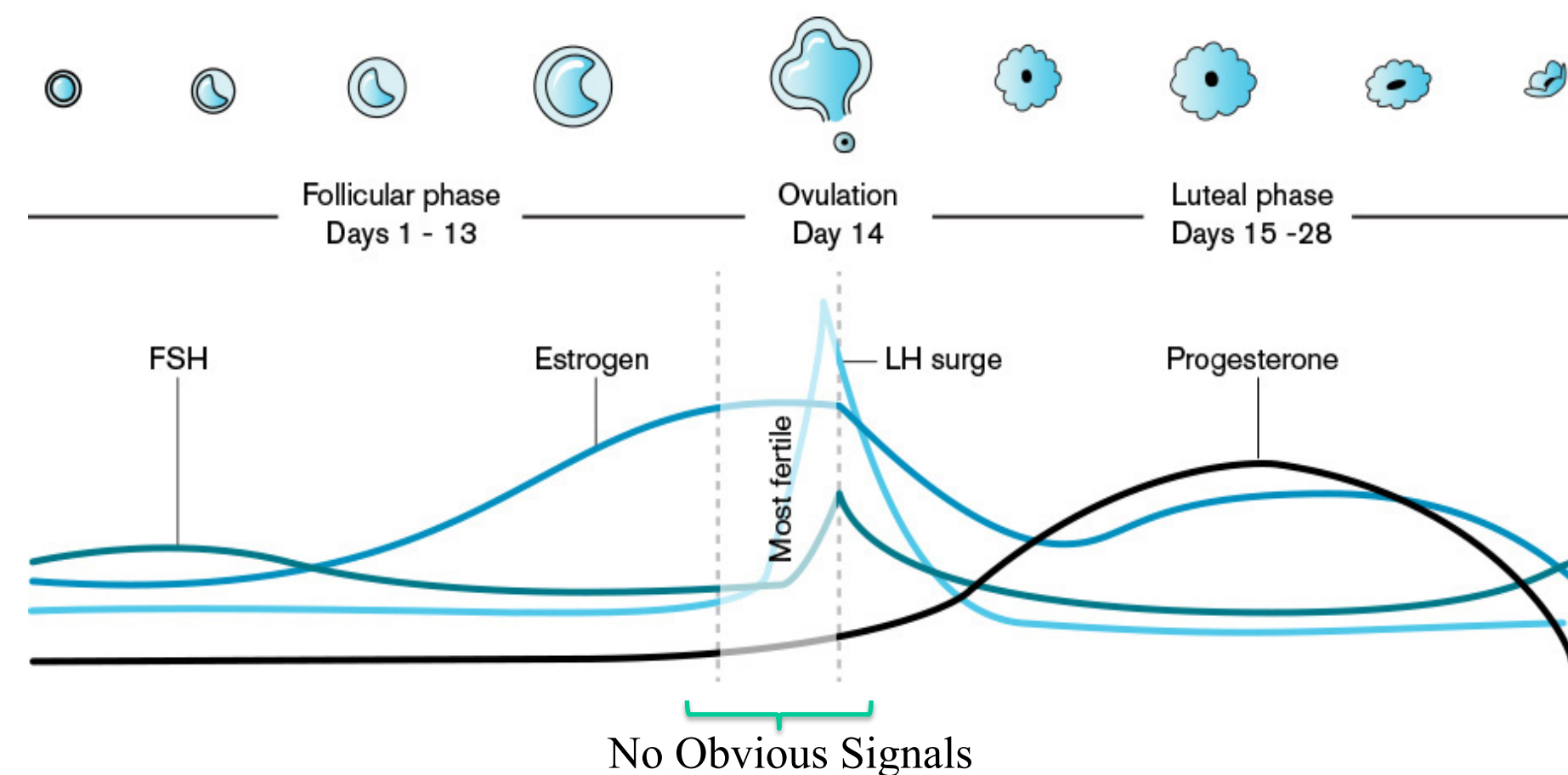
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## INTRODUCTION

### The Human Ovulatory Cycle:

- Average Length of 28 Days (22-35)
- Three Phases:<sup>3,4,7,8,9</sup>
  - Follicular: Menses and Follicle Development (Most Variable)
  - Ovulation: Release of Egg (End of Fertile Window)
  - Luteal: Uterine Lining Prepares for Pregnancy/Menses
- Fertile Window: 6 Days When Fertilization Is Possible



### The Effects of Estradiol and Testosterone:<sup>1,2,5,6</sup>

- Many Animal Species: Controls Copulation
- Most Primates: Influences Copulation; Signals Peaks in Sexual Behavior
- Humans: Influences Sexual Motivation

## GENERAL METHODS

### Participation Requirements:

- Cisgender Women
- Age 18-35
- Not Pregnant
- Not On Hormonal Contraceptives
- No Known Reproductive Disorders

### Methods of Determining Stage of Cycle:

#### Fertile (Day of Ovulation and 5 Days Proceeding)

- Confirmed:
  - Luteinizing Hormone Test (Pregmate®): Indicates Ovulation 24-36 Hours After LH Surge Is Detected
- Estimated:
  - Backwards Counting Methods (-13 and -15 Days From Start of Next Menstrual Cycle)
  - Forward Counting Method (+14 Days From Start of Last Menstrual Cycle)
  - Variable Forward Counting Method (<28 days: +8-12; 28-29 days: +9-15; >30 days: +11-17)
  - Actuarial Methods (Per-Day Risk of Conception): Jöchle Method and Wilcox Methods

#### Luteal / Not Fertile

- 6-Day "Luteal" Window:
  - Midway Estimation (Halfway Between Ovulation and Start of Menses)
  - +3 Estimation (Window After Ovulation)
  - +8 Estimation (Window After Ovulation)
- >6 Day "Non-Fertile" Window:
  - All Days Outside of Fertile Window
  - 4-Day Buffer
  - 8-Day Buffer

### Daily Journaling Questions:

1. Are you on your period?
2. Do you believe you are fertile today?
3. Please rate the intensity of your sexual desire today. (6-Point Scale)
4. Based on how you feel today, which of the following are you most likely to do? (Actively seek sex; Agree to sex if propositioned/offered; Avoid sex)
5. How happy do you feel today? (10-Point Scale)

### Urine Sample Collection:

Urine samples were collected for 10 days upon the completion of menses. Samples were collected between 10 AM and 8 PM and refrigerated until tested.

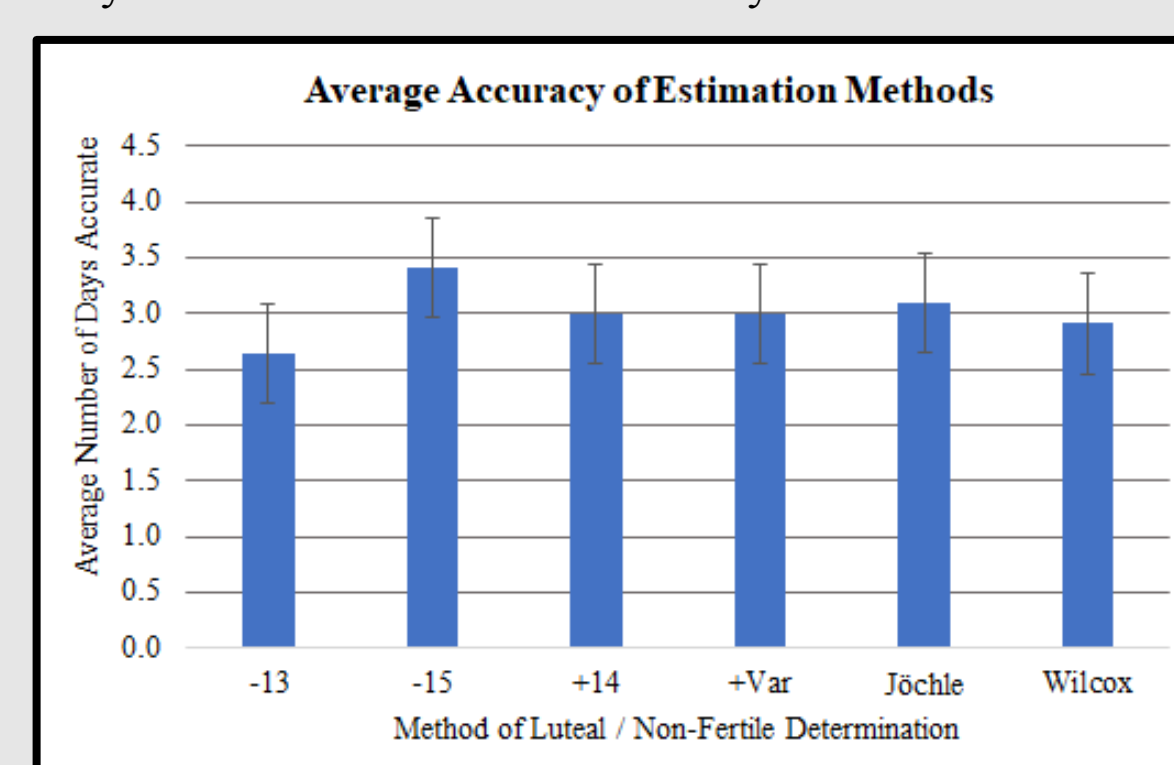
## Q1: Which Method of Fertility Estimation is Most Accurate?

### DATA ANALYSIS

- The number of days accurately predicted by each estimation method for each participant's cycle was identified.
- Linear Mixed Model:
  - Fixed Effects: Method of Estimation
  - Random Effects: Participant, Cycle
  - SPSS 26

### RESULTS

Figure 1. Average Accuracy of Estimation Methods in Days of the Fertile Window Correctly Identified



Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Intercept	2.909091	0.444643	57.437	6.543	<.000	2.018855	3.799327
-13	-0.272727	0.449678	105	-0.606	0.545	-1.164356	0.618901
-15	0.500000	0.449678	105	1.112	0.269	-0.391629	1.391629
+14	0.090909	0.449678	105	0.202	0.84	-0.80072	0.982538
+Var	0.090909	0.449678	105	0.202	0.84	-0.80072	0.982538
Jöchle	0.181818	0.449678	105	0.404	0.687	-0.70981	1.073447
Wilcox	0 <sup>a</sup>	0	N/A	N/A	N/A	N/A	N/A

(a) This parameter is set to zero because it is redundant.

Table 1. Significance of Fixed Effects in Relationship to Confirmed Fertility

### CONCLUSION

- Current non-hormonal estimation methods are significantly inefficient at approximating a woman's fertility.
- The 15 day backwards counting method is the most accurate method, catching ~56.82% of the fertile window.
- None of the non-hormonal methods are an appropriate proxy for hormonal testing.
- Implications:
  - Most research on female behaviors while fertile is based on faulty methodology.
  - New methods for fertility approximation should be investigated.
- Recommendation:
  - Avoid using estimates of fertility, and use care when selecting the luteal / non-fertile window for comparison.

## Q2: Can Women Tell When They Are Fertile?

## Q3: Does Fertility Affect Sexual Interest?

### DATA ANALYSIS

- Stage of Cycle Identified For:
  - Participant's Day of Cycle
  - Using Each Method of Estimation: Fertile, Non-Fertile / Luteal, Unknown
- 18 Linear Mixed Models:
  - 6 Methods of Luteal Determination
  - 3 Outcomes: Sexual Desire, Sexual Response, Fertile Belief
  - Fixed Effects: Stage of Cycle, Sexual Desire, Sexual Response, Fertile Belief, Happiness
  - Random Effects: Participant, Cycle
  - SPSS 26

### RESULTS

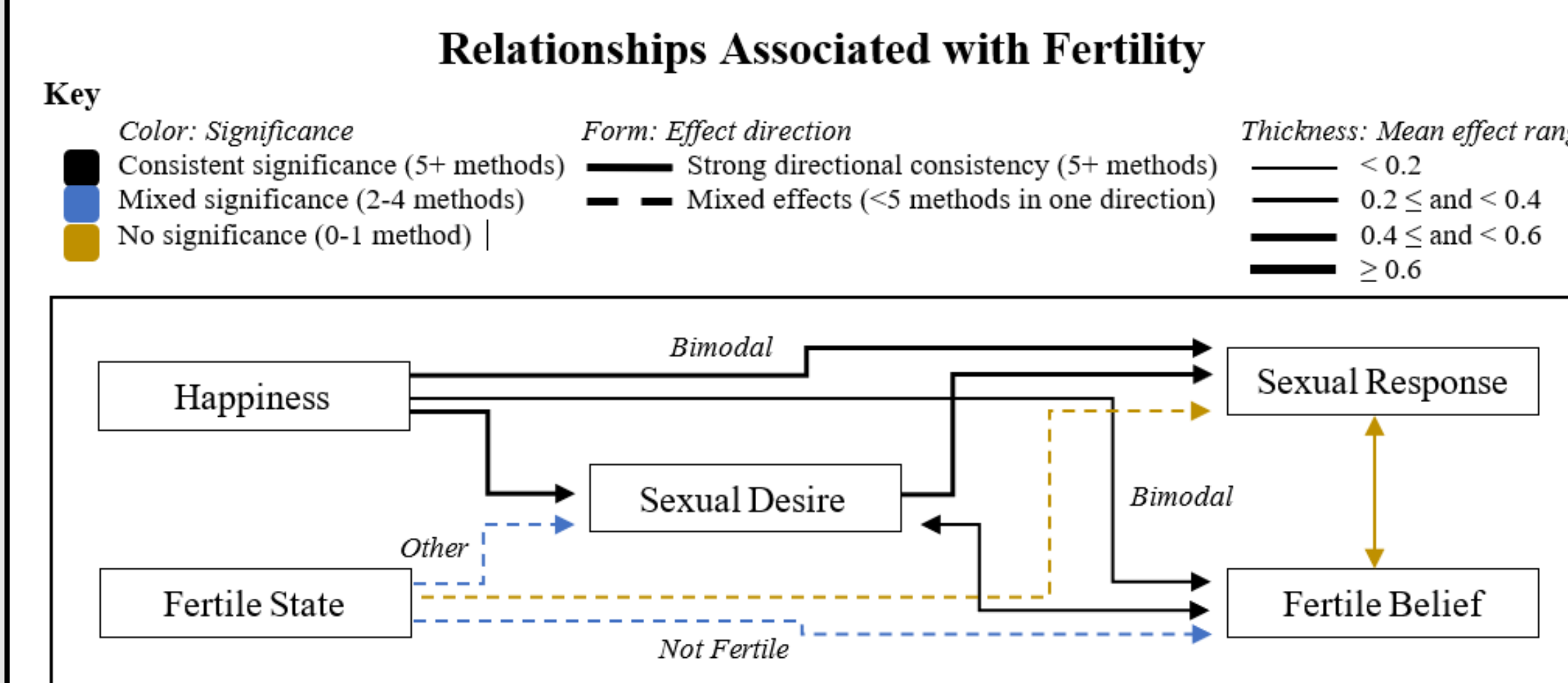
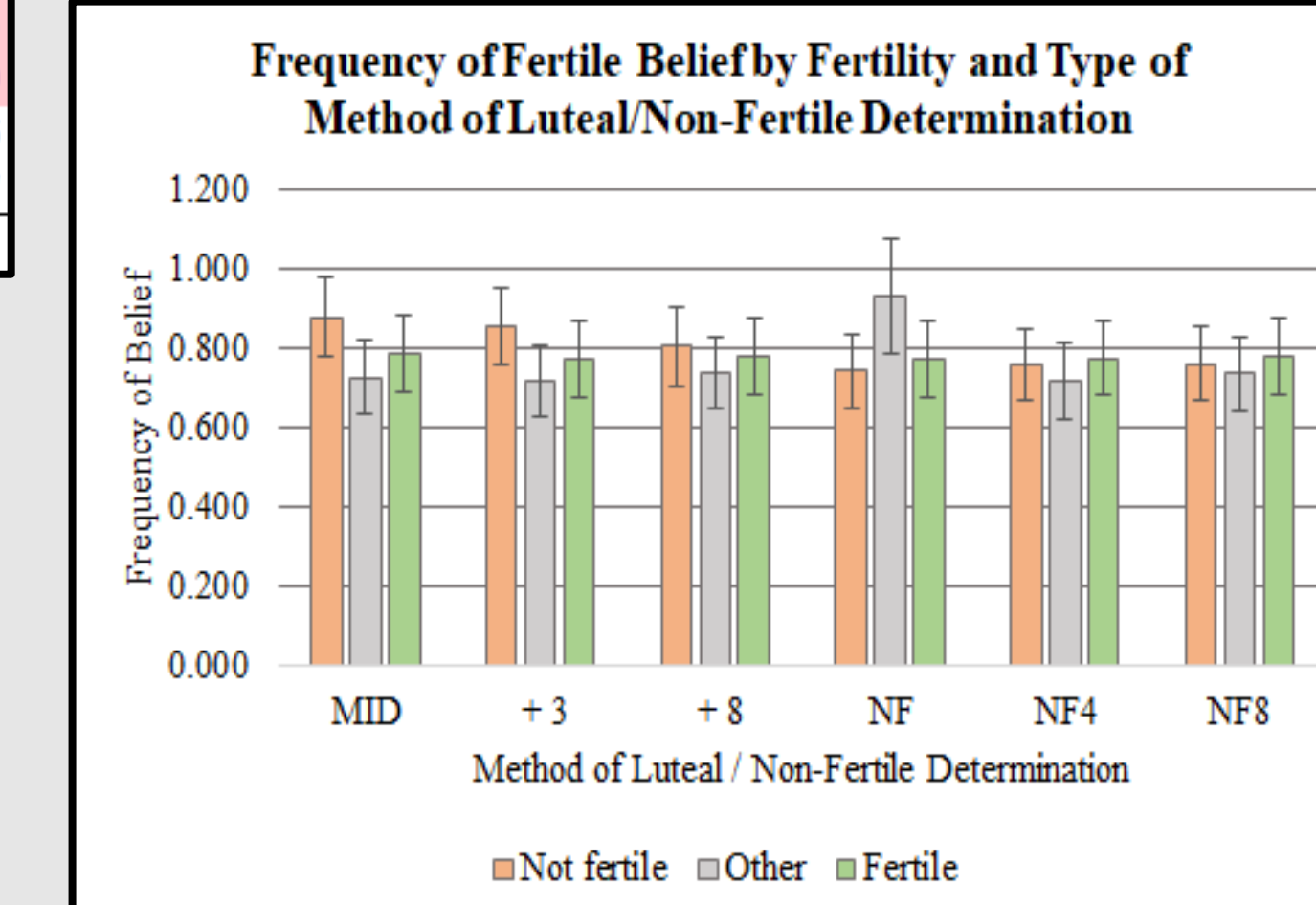
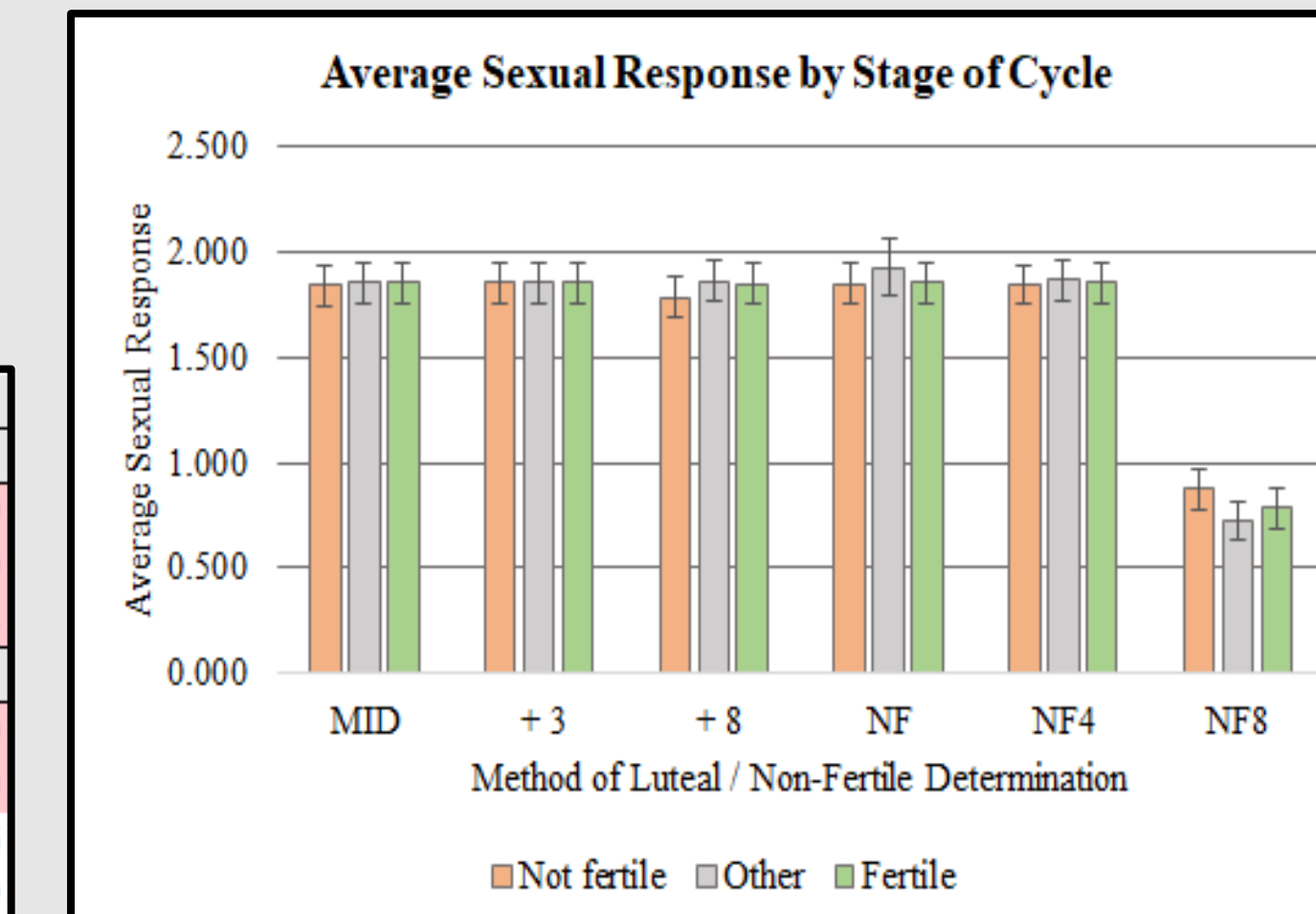
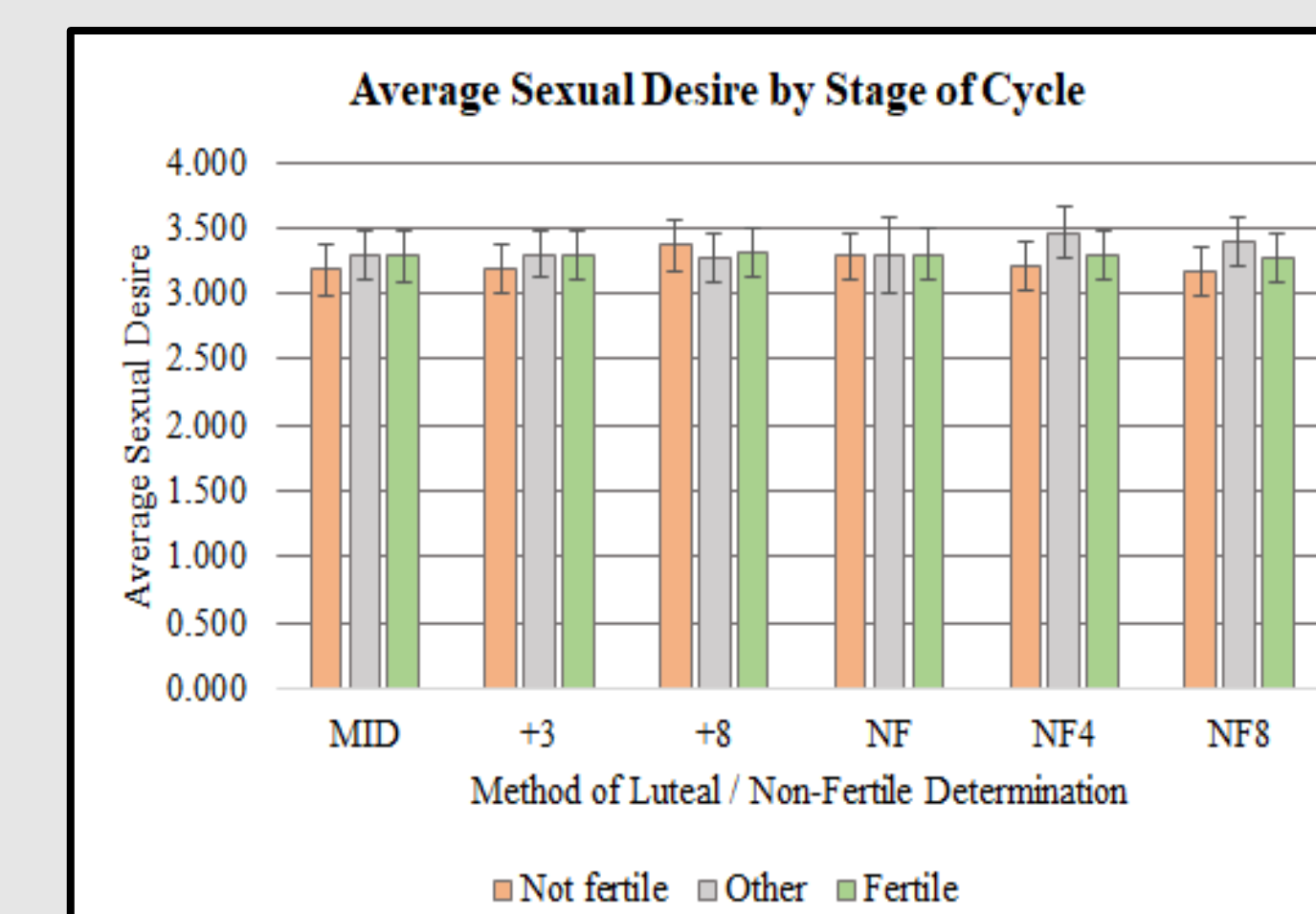


Figure 2. Results of the tested hypotheses. Differences in lines indicates differences in results from using different LNF methods. By default, effects are presumed as follows: high happiness, high sexual desire, high sexual response, high fertile belief, and fertile; variations from default are indicated.

Figures 3-5. Estimated Marginal Means for Sexual Desire, Sexual Response, and Fertile Belief by Stage of Cycle



### CONCLUSION

#### Q2: Can Women Tell When they Are Fertile? NO

- Even though participants reported high confidence in their knowledge of fertility in general and of their own cycles, they were not able to accurately predict their own fertility.
- This suggests fertility is concealed both physically and consciously.

#### Q3: Does Fertility Affect Sexual Interest? NO

- Fertility affects neither sexual desire nor sexual response.
- Sexual desire and sexual response are both influenced by general level of happiness.
- Sexual desire is influenced by fertile belief.
- This contradicts previous research that has indicated behavioral shifts with fertility.
- Proposed Explanation:
  - Reported effects of fertility are a consequence of confirmation bias due to the impact of this research on cultural beliefs (Fig 6.).
- Implications:
  - Reliance on poor methods of fertility determination is having an effect on research outcomes and cultural beliefs.
  - This impacts women seeking and avoiding pregnancy.
- Recommendations:
  - Avoid using estimates of fertility, and use care when selecting the luteal / non-fertile window for comparison.
  - Incorporate measures to detect confirmation bias in fertility research.

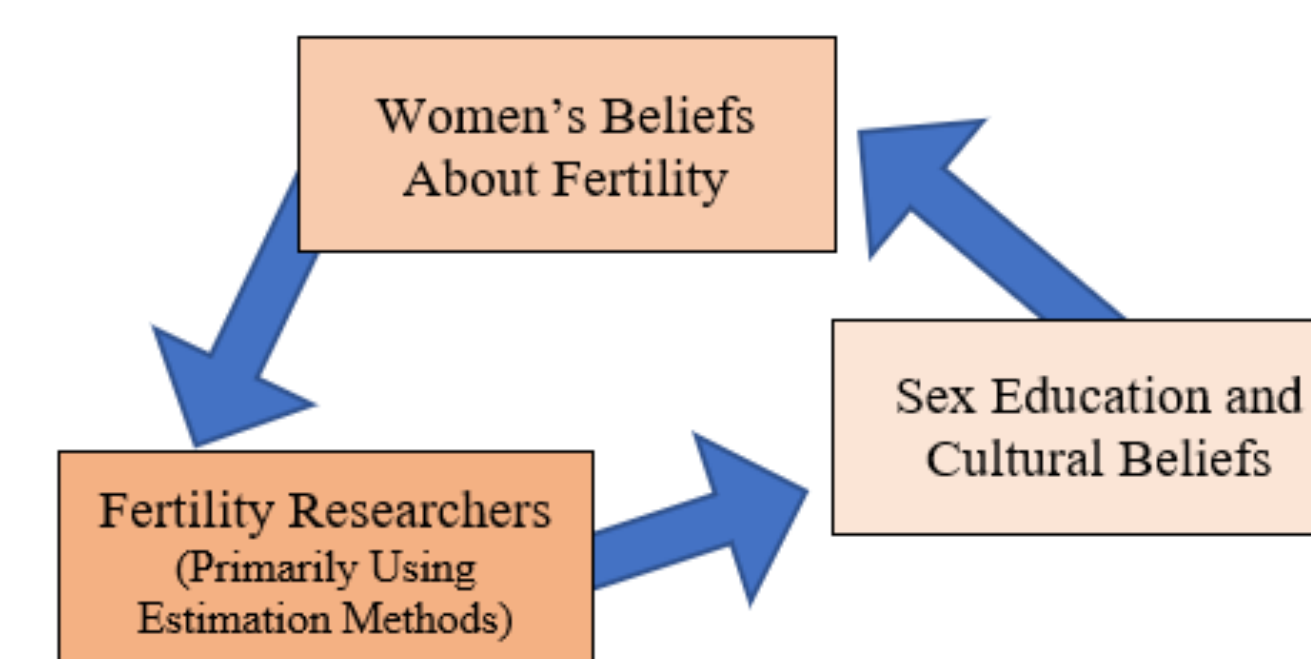


Figure 6. Proposed explanation for results.

	MID	+3	+8	NF	NF4	NF8
Desire						
Happiness	<.000	<.000	<.000	<.000	<.000	<.000
Belief	<.000	<.000	<.000	<.000	<.000	<.000
Fertility	0.369	0.354	0.453	0.963	0.01	0.004
Response						
Happiness	<.000	<.000	<.000	<.000	<.000	<.000
Desire	<.000	<.000	<.000	<.000	<.000	<.000
Belief	0.084	0.096	0.069	0.101	0.087	0.086
Fertility	0.928	0.995	0.104	0.766	0.821	0.679
Belief						
Happiness	0.041	0.063	0.034	0.046	0.044	0.043
Desire	<.000	<.000	<.000	<.000	<.000	<.000
Response	0.183	0.213	0.136	0.178	0.17	0.166
Fertility	<.000	0.002	0.198	0.216	0.49	0.587

Table 2. Significance of Fixed Effects in Relationship to Confirmed Fertility By Method Of Luteal/Non-Fertile Determination

Significant values are highlighted in red.

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