



# Consequences of Negatively Worded Items on the Predictive Capabilities of the NEO

Jonathan Park, B.A., Kathleen S. J. Preston, Ph.D., Deshawn Sambrano, Patrick Manapat, B.A., and Netasha Pizano, B.A.

CALIFORNIA STATE UNIVERSITY  
**FULLERTON**

## Introduction

### Conundrum of Negatively Worded Items

- Cronbach (1958) suggested utilizing negatively worded items (NWI) to counter response sets.
- Matlock, Turner, and Dent Gitchel (2015) demonstrated that NWI's functioned dissimilarly to positively worded items in that participants responded differently to NWI's than they did to their positively worded counterparts.
- Roszkowski and Soven (2010) also found that the only 2-NWI's were enough to generate a factor separate from a factor composed of positively worded items.

### NEO-PI-R

- The personality domain "Openness to Experience" has been empirically shown to relate to various measures of crystallized intelligence such as verbal IQ scores.

## Purpose

- Evaluate the functioning of the negatively worded items (NWI's) within the NEO.
- Examine if NWI's provide differing amounts of information compared to positively worded items
- See if these differences manifest in relationships that vary from the established literature
- See if the Nominal Response Model (NRM) can be used to maximize the information obtained from negatively worded items.

## Methods

### Participants

- A sample of undergraduate students were surveyed from the undergraduate research pool at California State University, Fullerton ( $N = 143$ ,  $M_{age} = 20.86$ )

### Measures

- NEO-PI-R – All facets of the NEO were utilized in order to potentially elucidate upon relationships between intelligence and personality that may be uncovered due to removal of measurement artifacts.

### The Nominal Response Model (NRM)

- Grants a unique perspective to item functioning by allowing for assessments of category boundary discrimination (CBD) parameters.
- Provides insight into the functioning of categories within items that other divide-by-total models do not.
- Allows for the manipulation of category response options granting researchers the ability to tailor scales to best fit a given population.

### Parameter Linking

- Utilized in order to standardize negatively and positively worded items allowing for meaningful comparisons along the trait distributions.

## Results

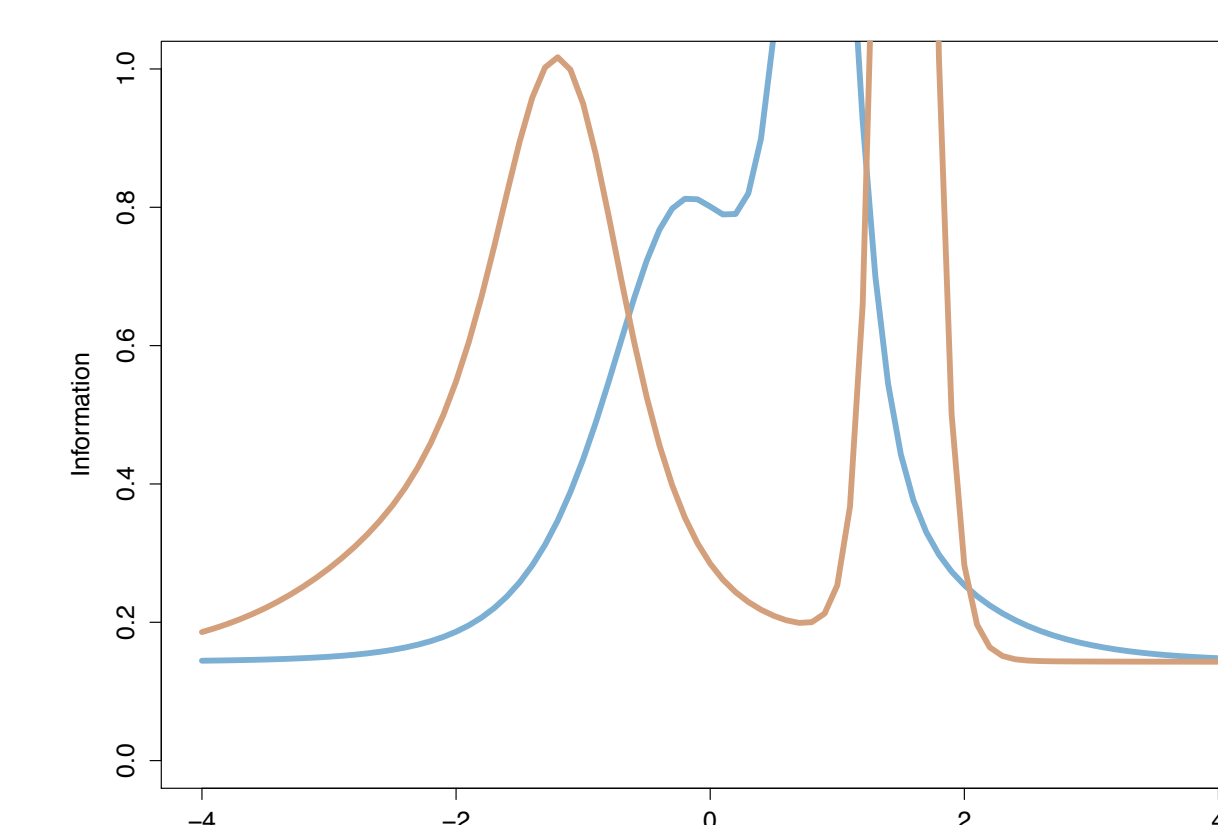


Figure 1. Test information of Agreeableness

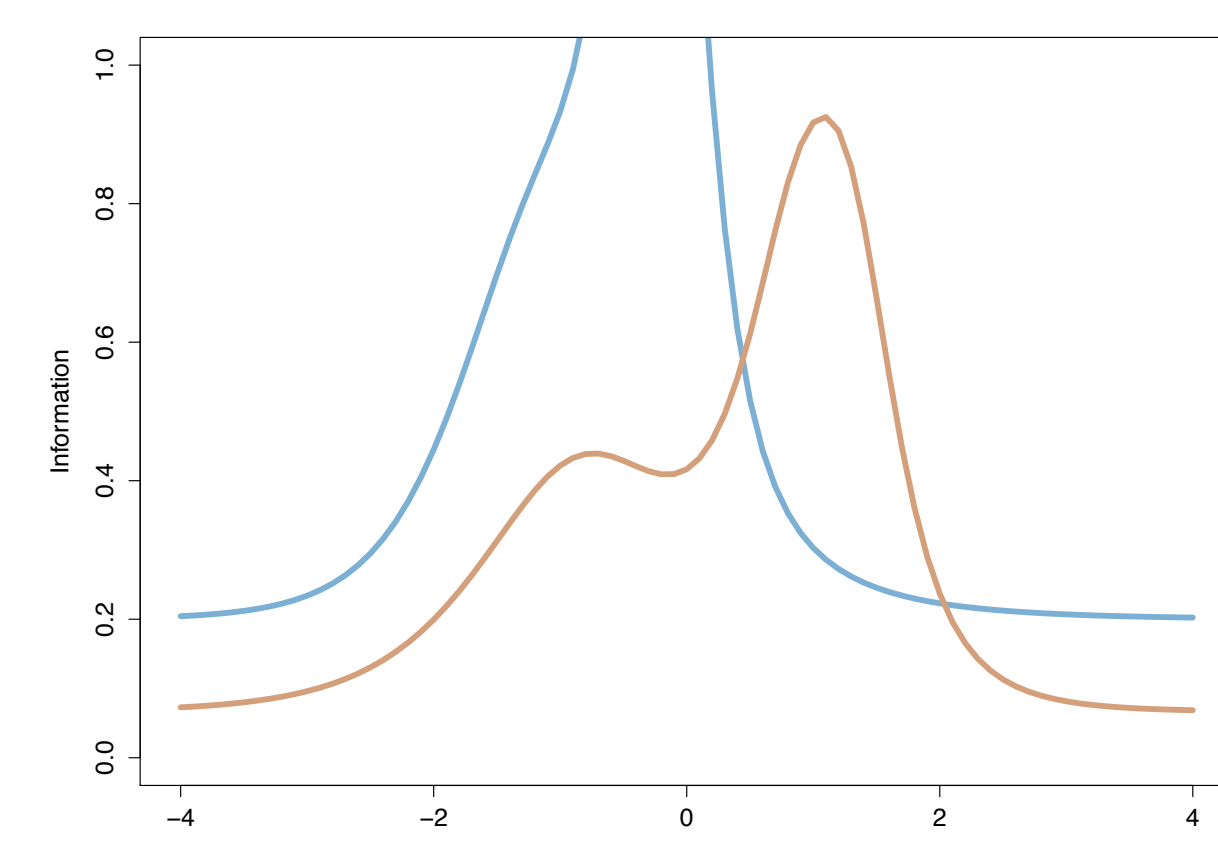
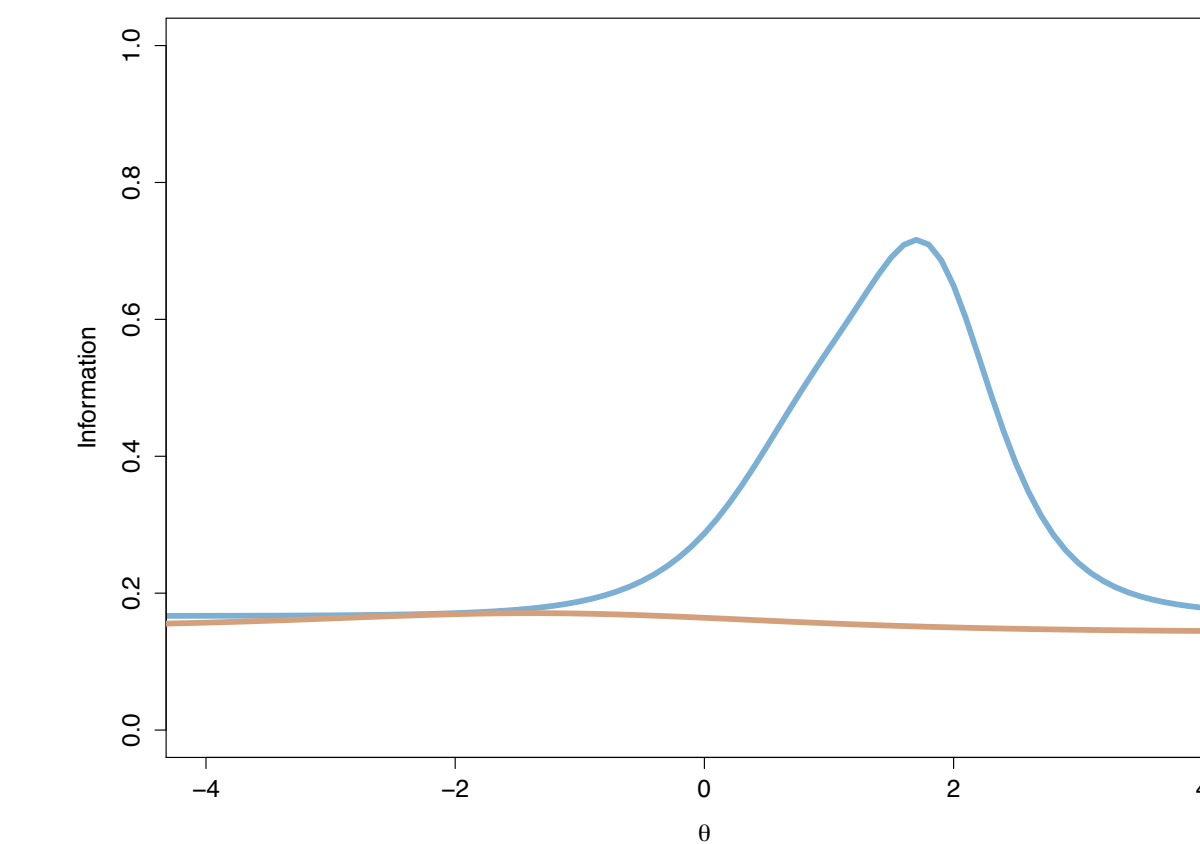


Figure 2. Test information of Conscientiousness

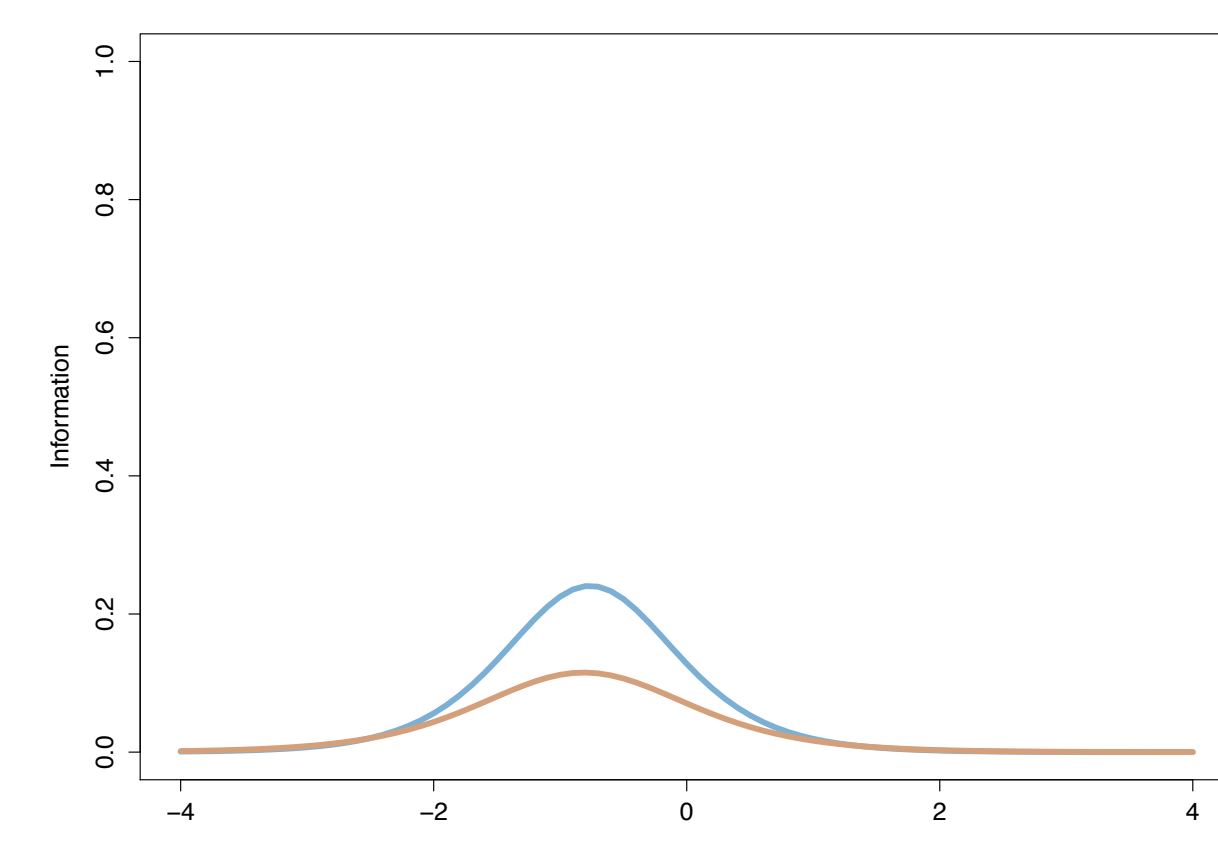
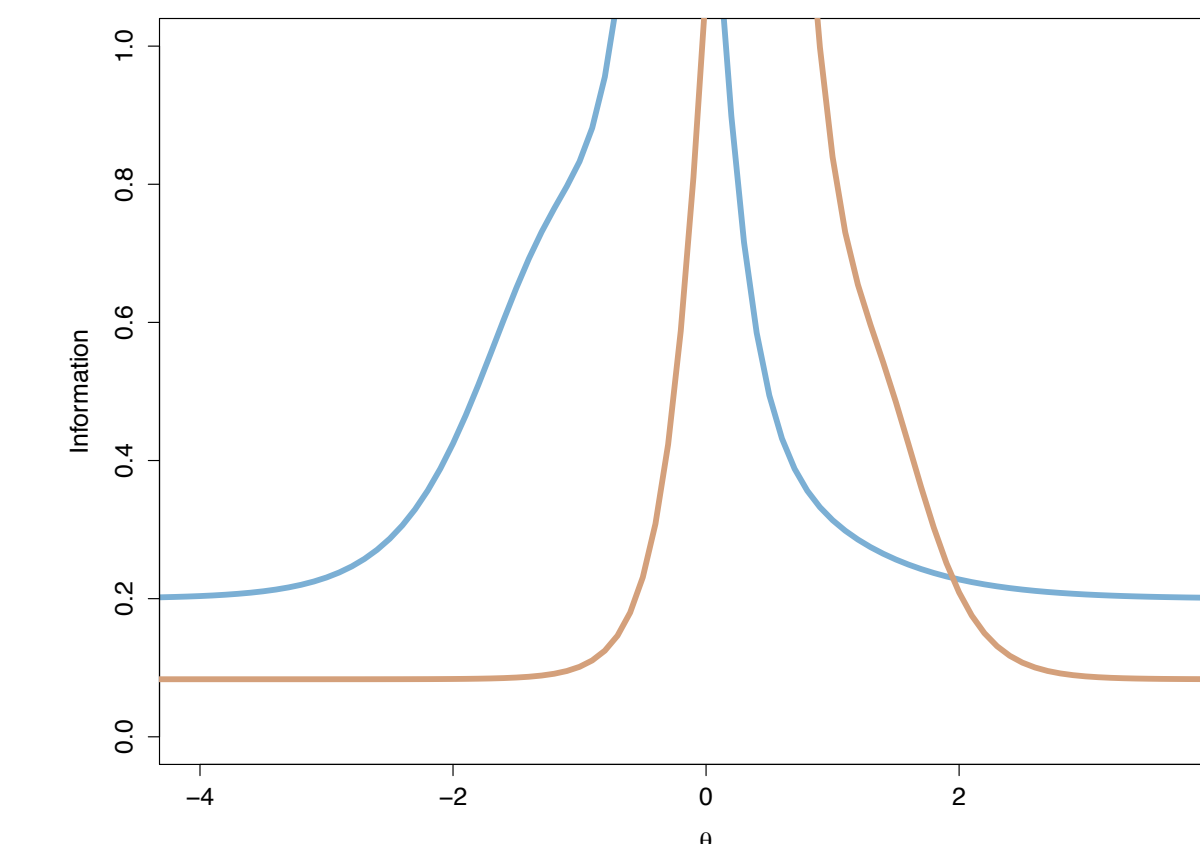


Figure 3. Test information of Extraversion

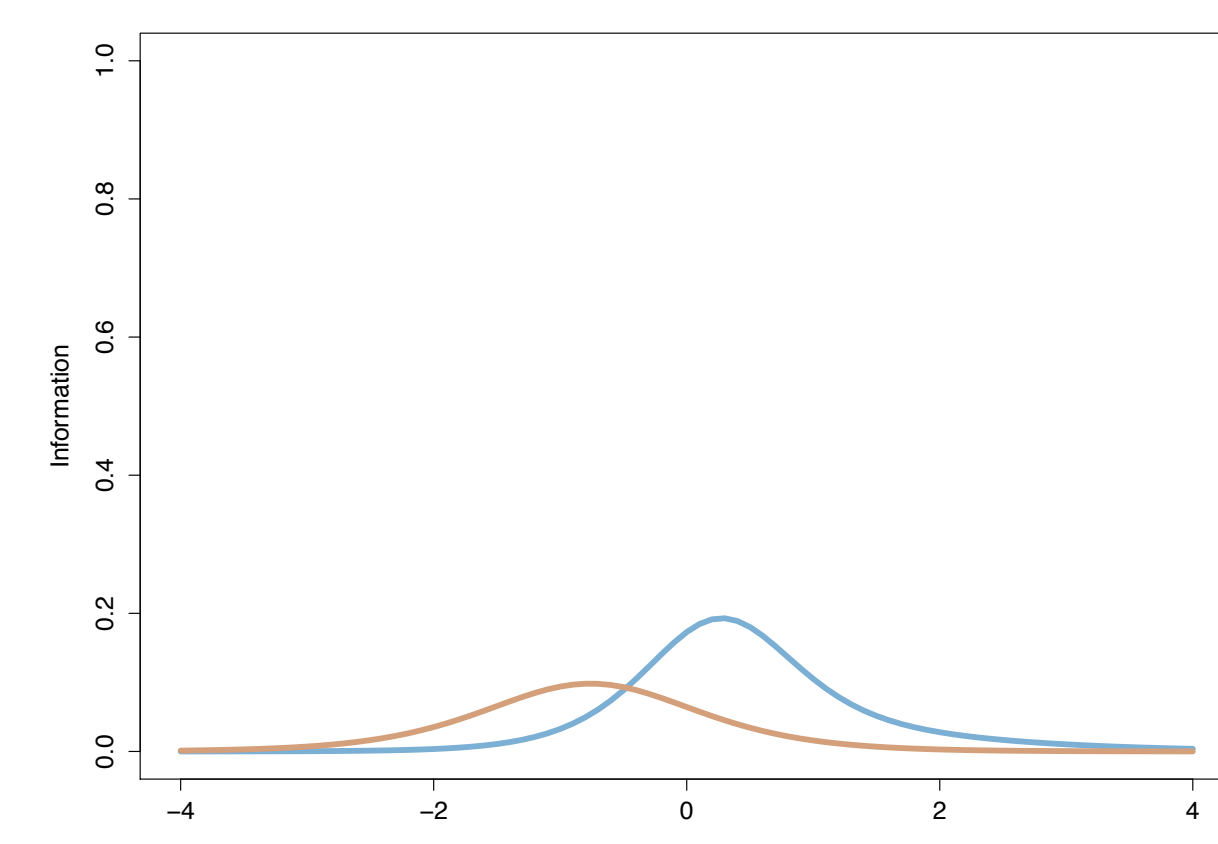
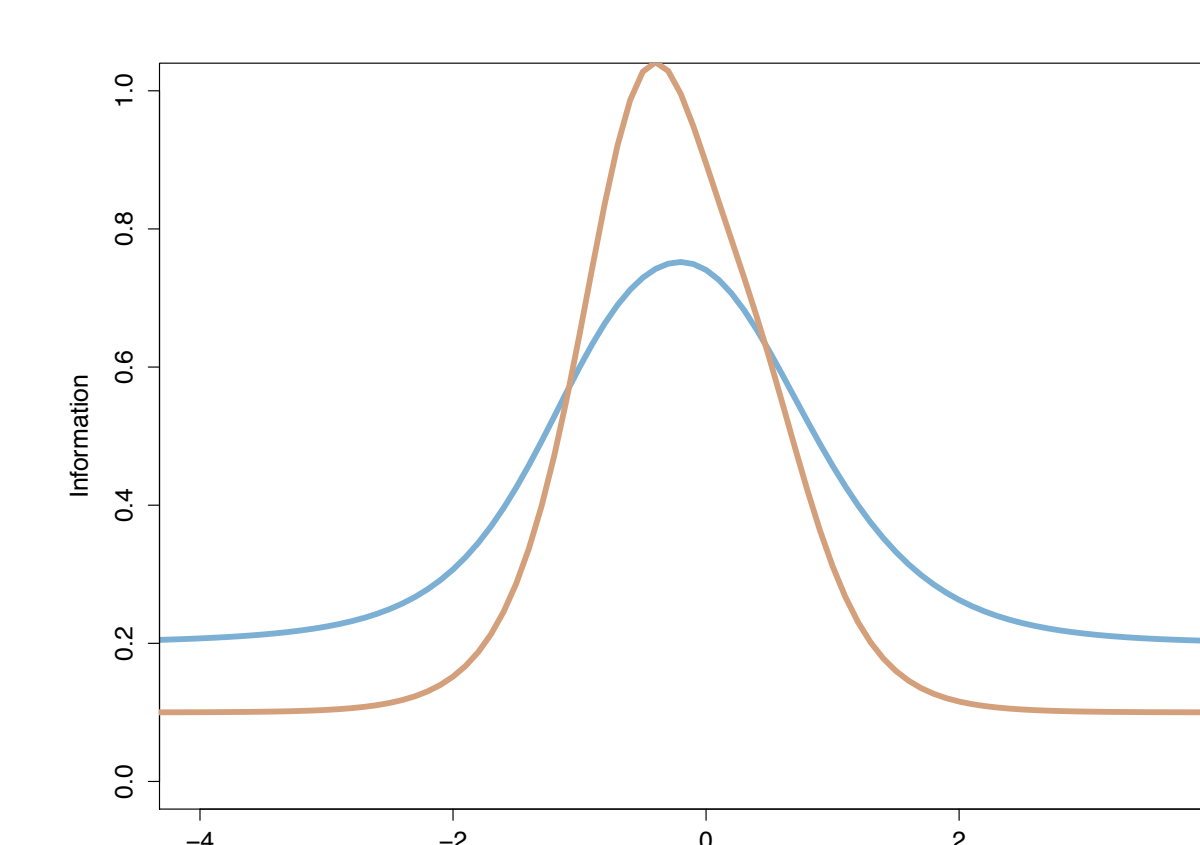


Figure 4. Test information of Neuroticism

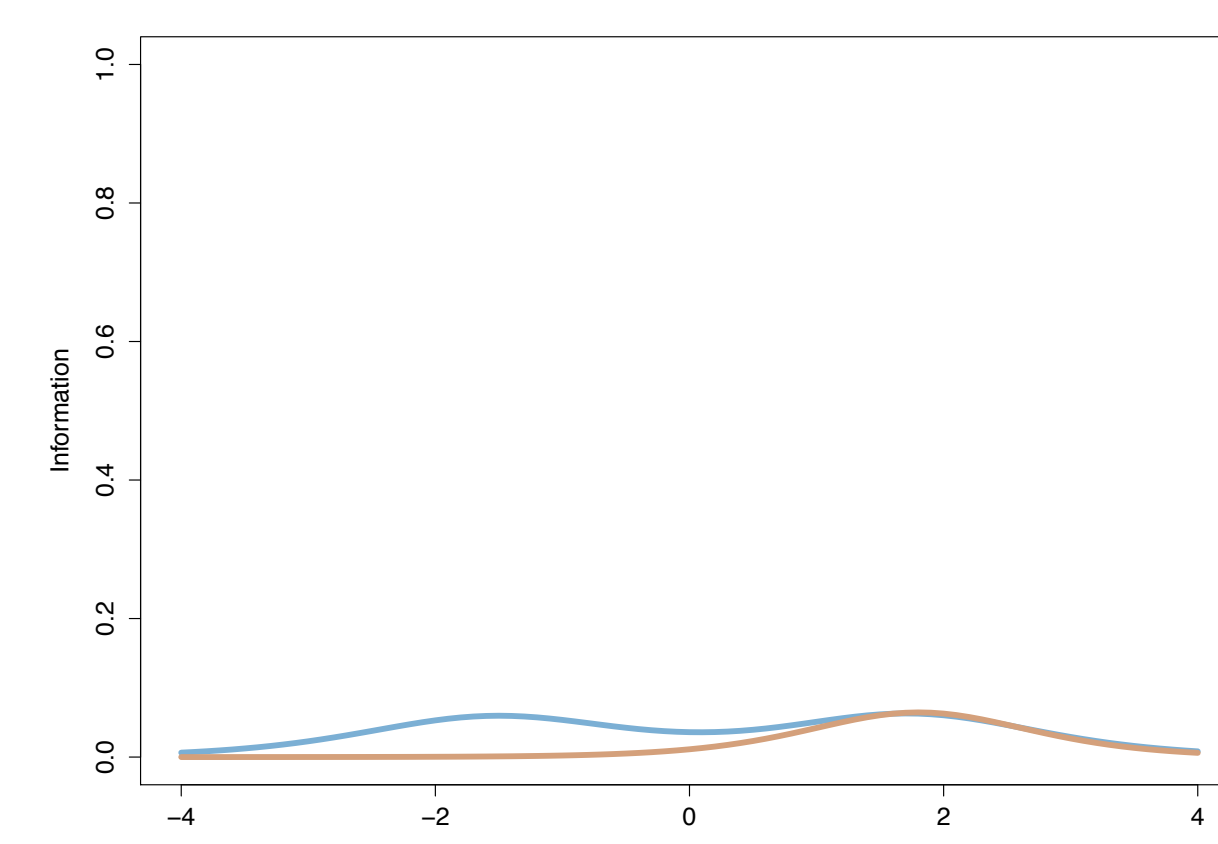
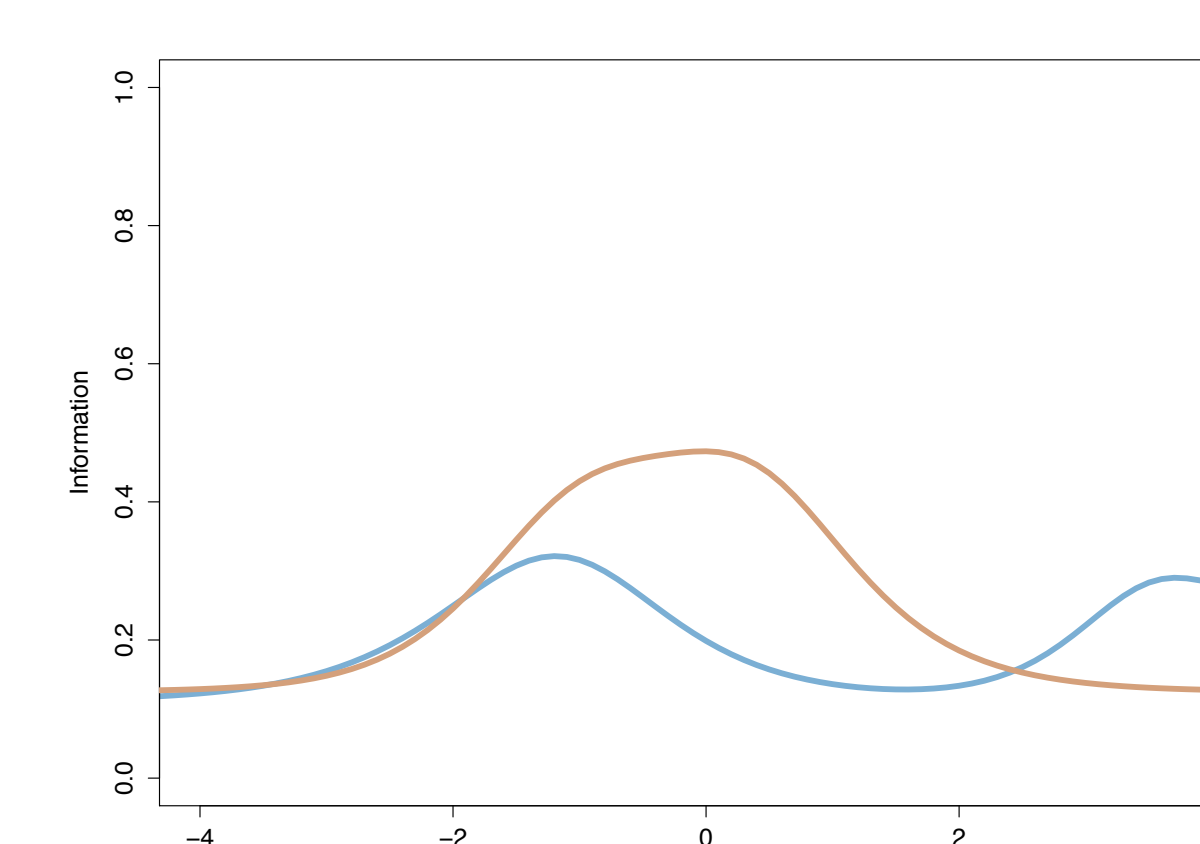
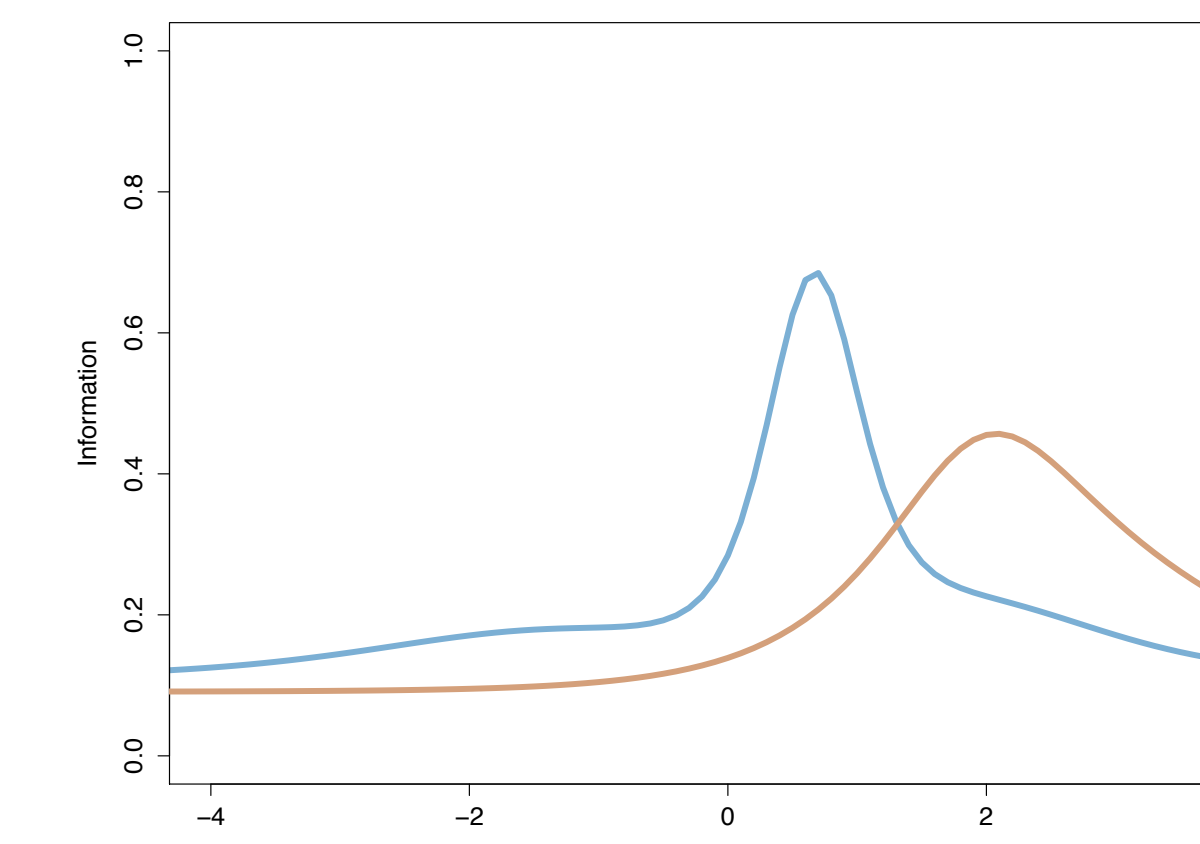


Figure 5. Test information of Openness



## Results

### Test Information

- Agreeableness
  - Negative items proved to be informative at average- to high-expressions of agreeableness with positive items providing no information.
- Conscientiousness
  - Positive and negative items were very informative at average expressions of conscientiousness.
- Extraversion
  - Positively worded items were more informative at average expressions of extraversion.
  - Negative items were more informative at negative and positive extremes of the latent trait.
- Neuroticism
  - Positively worded items provided more information across the entirety of the latent trait with negative items proving to be informative at extremely positive expressions of neuroticism.
- Openness
  - Positive items were more informative at higher expressions of Openness with negative items proving to be more informative at low- to average-levels of the latent trait.

### Nominal Response Model (NRM) and Parameter Linking

- Adjustments made via the NRM and subsequent parameter linking allowed for an optimization of the NEO providing an unbiased measure of the underlying construct.
- The alterations maximized the information provided by negatively and positively worded items on the entirety of the Big 5.

### Structural Equation Model (SEM)

- The Big-5 personality traits were entered into a structural equation model and the results indicated poor fit of all traits, *Satorra-Bentler*  $\chi^2 = 128.04$ ,  $p < .001$ , *RMSEA* = 0.135, 90% CI [0.108, 0.160].

## Conclusion

- In line with previous research, negatively and positively worded items diverged in the amount of information they provided as well as where along the respective latent traits across the entirety of the Big-5.
- The Nominal Response Model (NRM) and IRT parameter linking allowed for the maximum amount of information to be obtained from negatively and positively worded items within the NEO.
- IRT parameter linking grants the ability to standardize negative and positive items rendering the two formats directly comparable.
- This methodology may serve as a workaround for the conundrum of negatively worded items by proposing a methodology for maximizing information and standardizing the different response formats.
- While the established literature suggests that Openness is related to crystallized intelligence, our model did not show that. These findings could suggest that the established relationship between Openness and intelligence could be due to measurement artifacts caused by negatively worded items.

