



# Relationship between Prenatal and Perinatal Conditions and IQ Differences in Children with ASD

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## Background

- Autism Spectrum Disorder (ASD) is a developmental disorder including social, communication, and behavioral challenges (CDC, 2018)
- Children with ASD are more likely to have experienced perinatal complications as compared to typically developing (TD) children (Gardener, 2011)
- ASD in males is 4 times more prevalent than in females (Halladay, 2015).
- Variables that affect the severity of ASD are still understudied.
- This study explores the relationship between prenatal and perinatal conditions and IQ differences (FSIQ) in children with differing severities of ASD. We hypothesize that:
  - Children with lower IQ levels and higher severity of ASD will have had lower average birth weight.
  - Mothers who have children with lower IQ levels will report a higher number of pregnancy related complications.
  - Mothers who have children with lower IQ levels will report a higher rate of prescription medication use during pregnancy.
  - Gender differences within the three tested variables will also be explored.

## Methods

**PARTICIPANTS:** 107 children aged 6 to 11 years diagnosed with differing severity of ASD were included in the study.

	N	Mean	SD
Females	22	---	---
Males	85	---	---
Age	---	8.79	1.68
FSIQ	---	97.09	18.38
ADOS Score	---	7.58	1.68

### MEASURES:

- Severity of ASD was confirmed via ADOS-2, a clinical-child measure that scores on child's social, repetitive behaviors, and communication skills that gives a score of 1 to 10.
  - Low severity is a score less than 5.
  - Moderate severity is between scores 5 and 7.
  - High severity is a score more than 7.
- Full Scale IQ (FSIQ) in each child was measured via the DAS-II evaluation tool, which measures the cognitive abilities (IQ) of children on verbal and non-verbal domains.
  - Lower IQ is defined as FSIQ < 80.
  - Upper IQ is defined as FSIQ ≥ 80
- Parents completed a self-reported Autism Center of Excellence (ACE) subject medical history form that includes pregnancy complications and child medical history.
  - Birth weight is defined as the weight of the infant at the time of birth.
    - Low birth weight is defined as BW ≤ 5lb 7oz.
    - Normal birth weight is defined as 5lb 8oz to 9lb 4oz.
    - High birth weight is defined as BW ≥ 9lb 5oz.
  - Prescription medication use is self reported - whether the mother used any prescription medications during any part of their pregnancy.
  - Pregnancy complications are defined as any health problems that occur during pregnancy or labor for the mother or child.

## Results

### Birth Weight

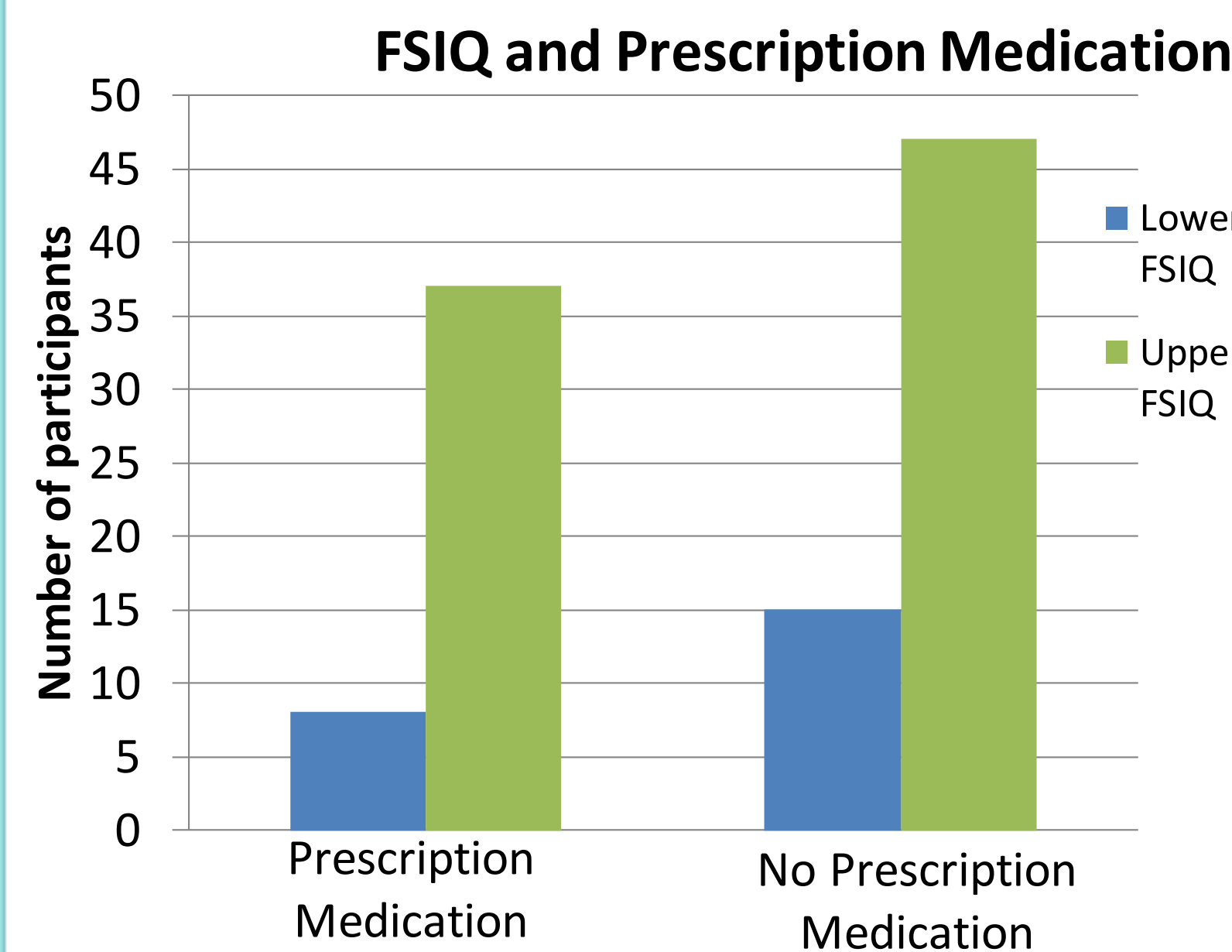
	Low Birth Weight	Normal Birth Weight	High Birth Weight
Average ADOS Score	8.81	7.42	8.19

There is no significant difference in average ADOS scores between children with low, normal, or high birth weight. (p = .06).

	Low Birth Weight	Normal Birth Weight	High Birth Weight
Average FSIQ	89.29	99.13	82.56

High birth weight infants have significantly lower average FSIQ as compared to normal and low birth weight infants. (p = .02).

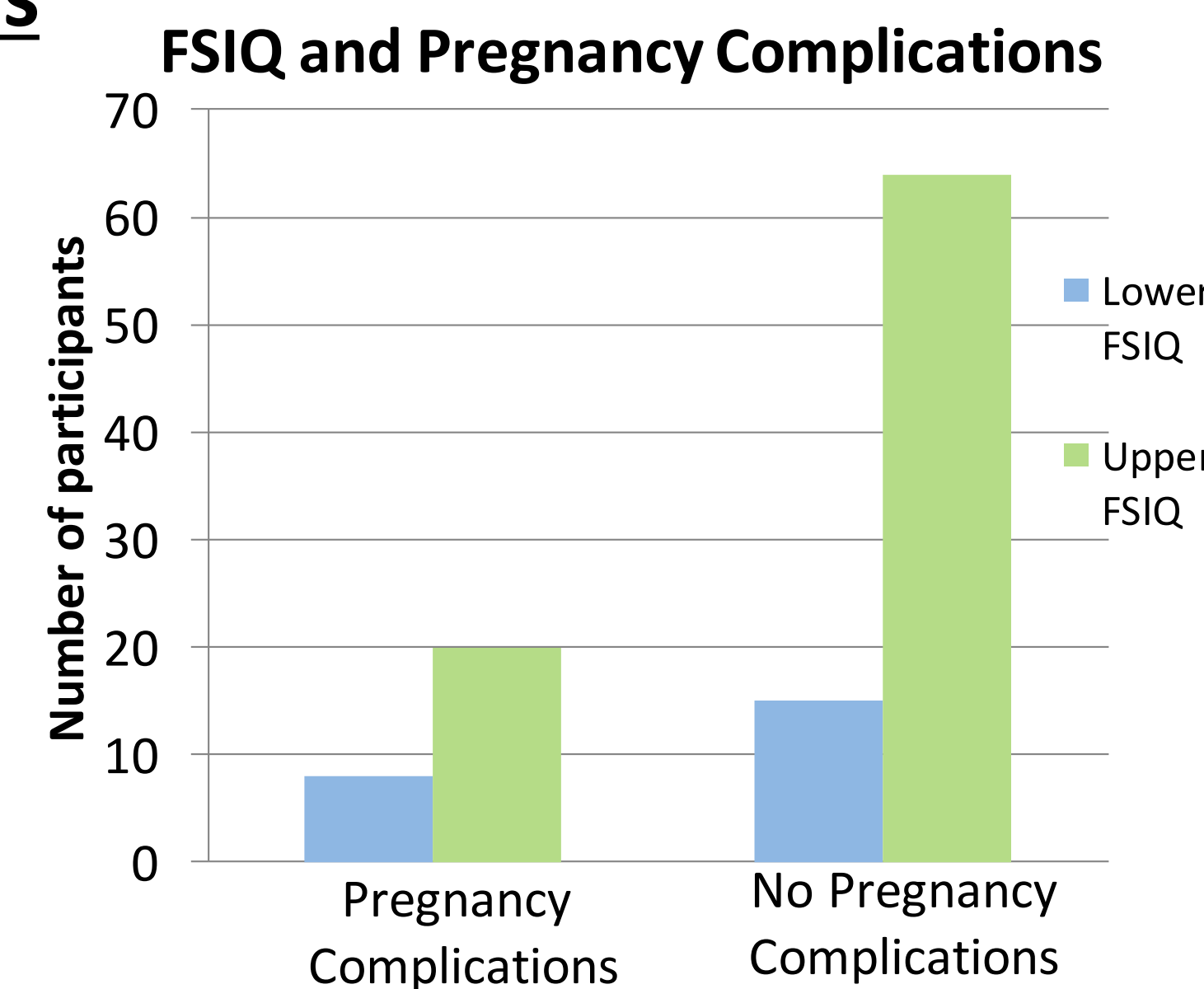
### Prescription Medication Use



There is no significant difference in exposure to prescription medications between children with lower or higher FSIQ (p = .12).

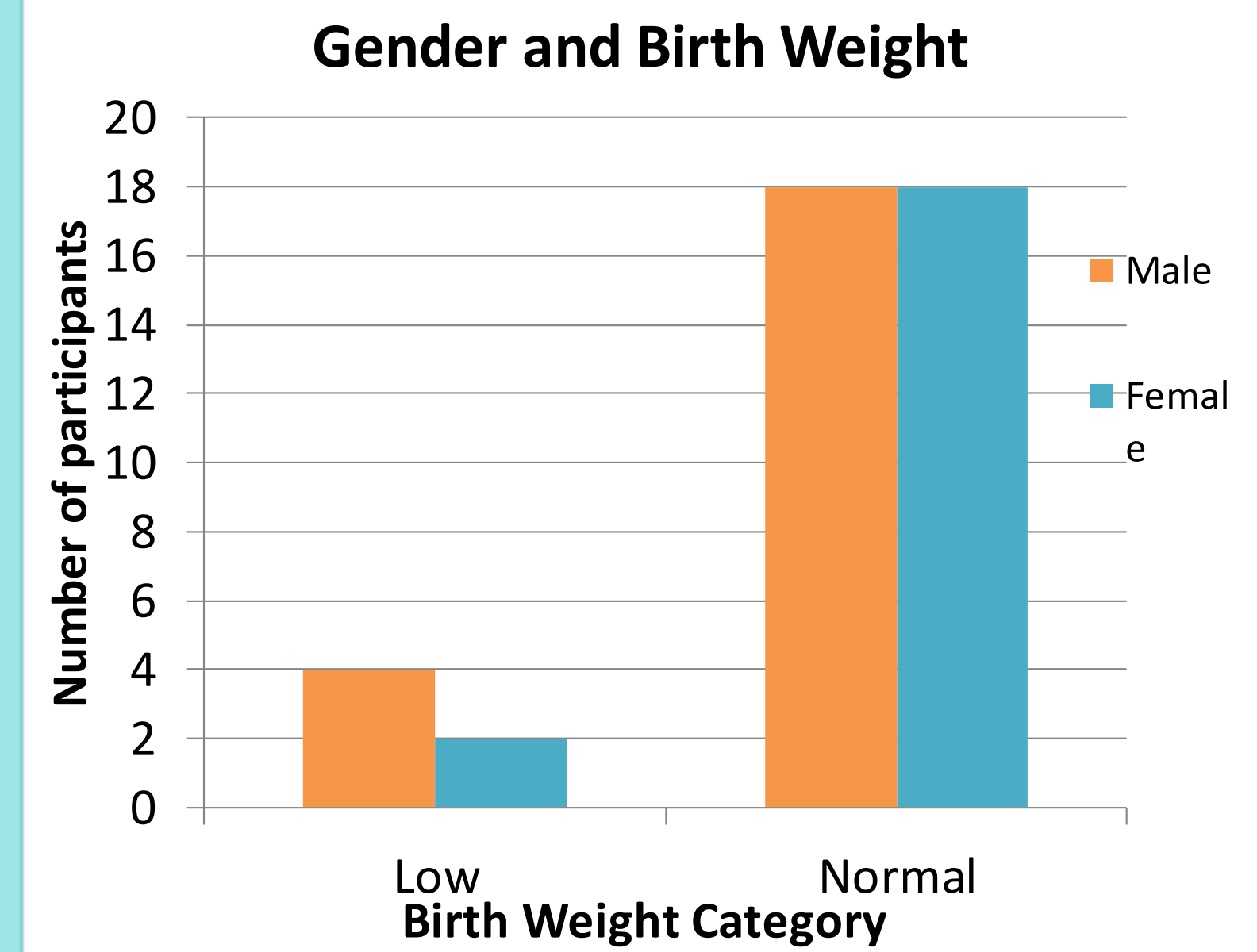
### Pregnancy Complications

There is no significant difference in pregnancy complications between children with lower and upper FSIQ (p = .79).



### Gender Differences

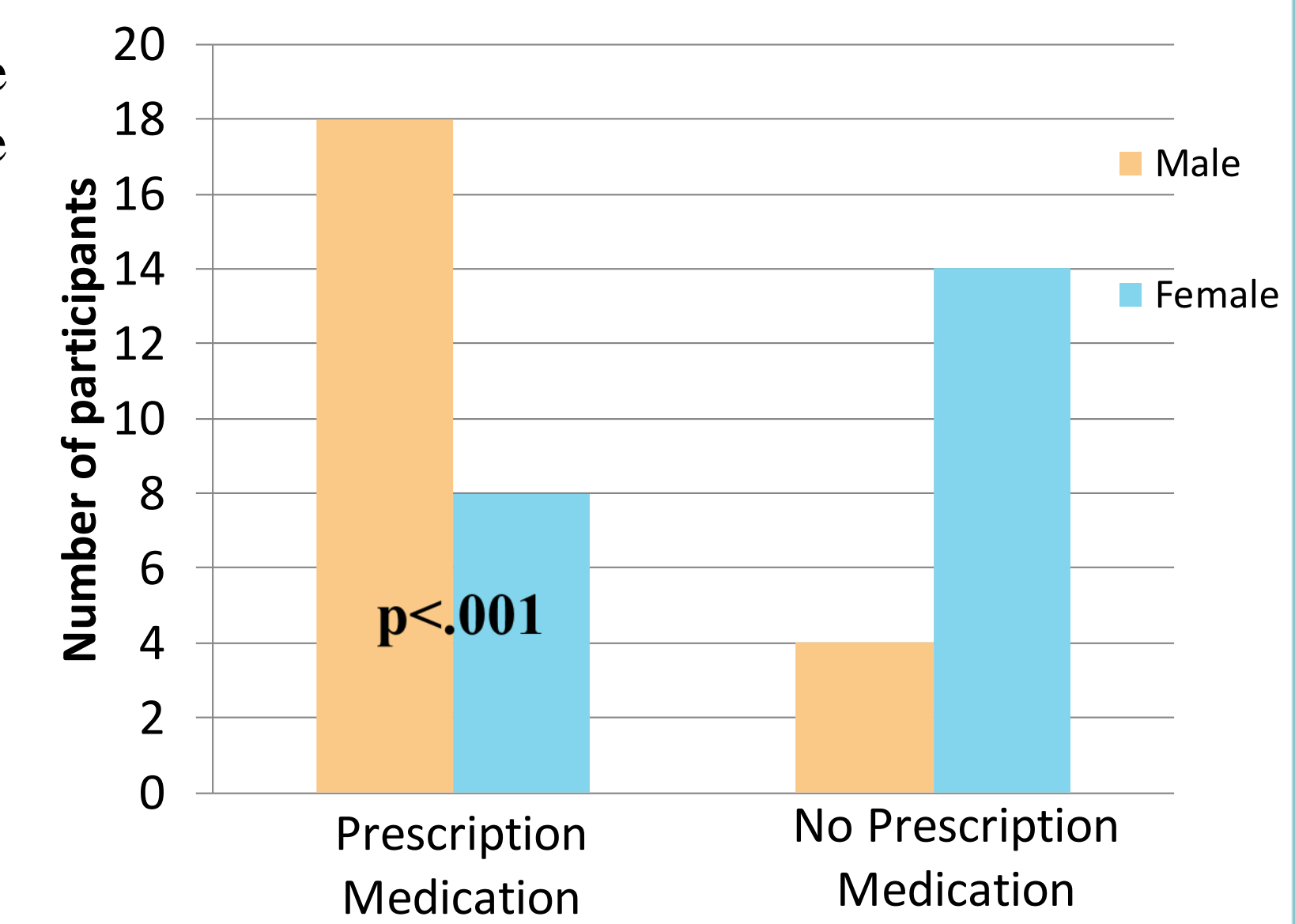
For gender differences analysis, a subset (n=44) of the total sample were included. The sample consisted of 22 females and 22 males.



There is no significant difference in birth weight between females and males.  $X^2(2, N = 44) = 2.67, p = .26$

### Gender and Prescription Medication

Mothers who have male children with ASD have significantly reported more exposures to prescription medication as compared to mothers who have female children with ASD.  $X^2(6, N = 44) = 55.83, p < .001$



## Discussion

### DISCUSSION:

- Significant differences were found between the participants' FSIQ score in different birth weight categories. Children with lower FSIQ were more likely to report higher rates of birth weight as compared to children with upper FSIQ.
- Male and female children were found to be significantly different in exposure to prescription medications, while birth weight in male and female infants had no significant differences.
- Our findings did not find any significant differences between severity of ASD and birth weight or between FSIQ and birth weight, exposure to prescription medications, and pregnancy complications. These results differ with existing research studies.
- Although the findings from the data was inconclusive, further research would aid in diagnosing different phenotypes of ASD, tracking the progress of ASD in individuals, and eventually with treatment.

### LIMITATIONS:

The self-reported ACE subject medical history form categorizes prescription medication use and pregnancy complications as a yes/no question. Firstly, parents may misreport due to social stigma. Secondly, the broad categorization makes it difficult to conclude a causal correlation. Individual pregnancy complications and prescription medication use during pregnancy should be investigated to see the impacts that it may have on infants.