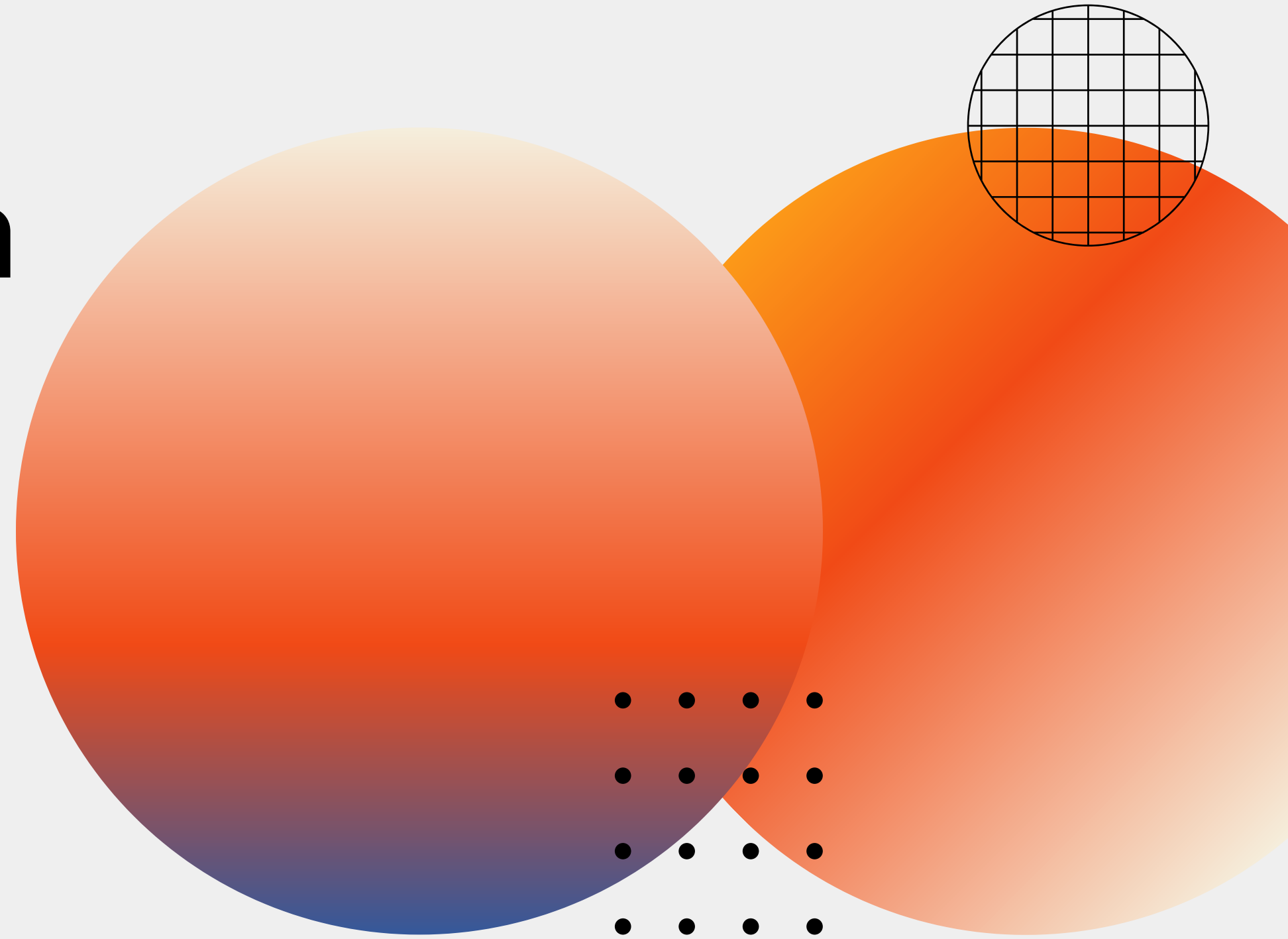
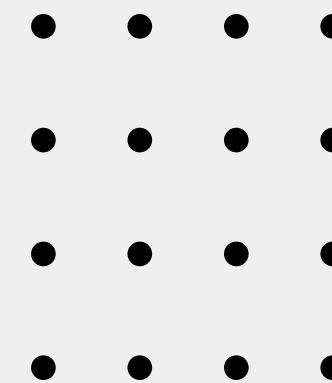



Causal Research Perceived trust between virtual and human influencers



The problem



Virtual influencers are gaining popularity on social media as a way for their developers to monetize VIs online presence. However, it is still unclear whether humans perceive VIs positively and are influenced by their promotional endorsements.



Causal Research Design Overview



Goal

To evaluate the perceived trustworthiness of virtual influencers compared to human influencers.



Causal Question

Does the type of influencer (virtual vs. human) cause a difference in consumers' perceived trust?



Units of Analysis

Individual participants.

Recruitment sources:

- On-campus surveyed students
- Online survey participants

Dataset

34 observations (participants)

2 treatment groups

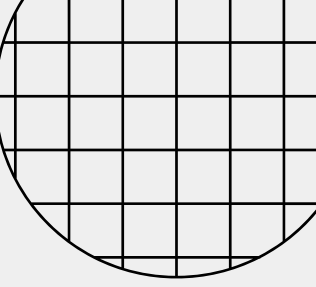
Virtual
Influencers (V)

17 responses

Human
Influencers (H)

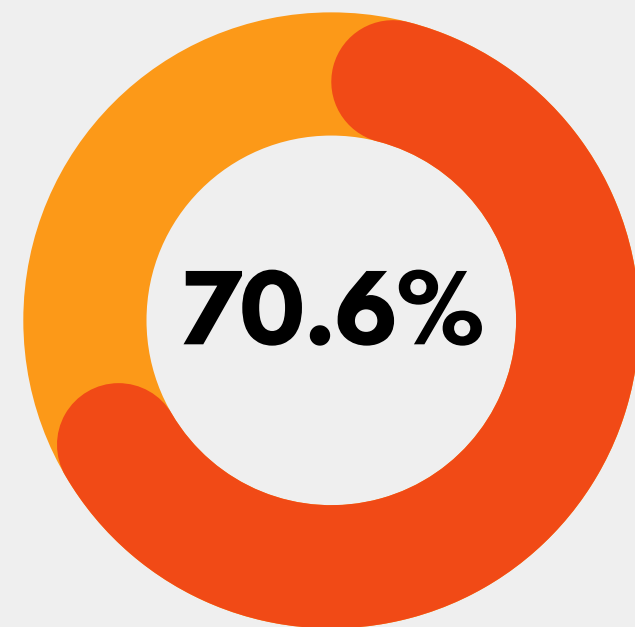
17 responses



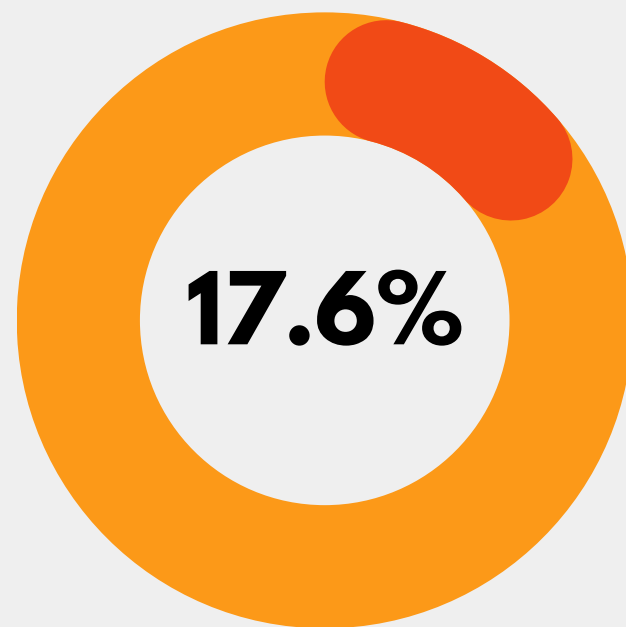


Dataset

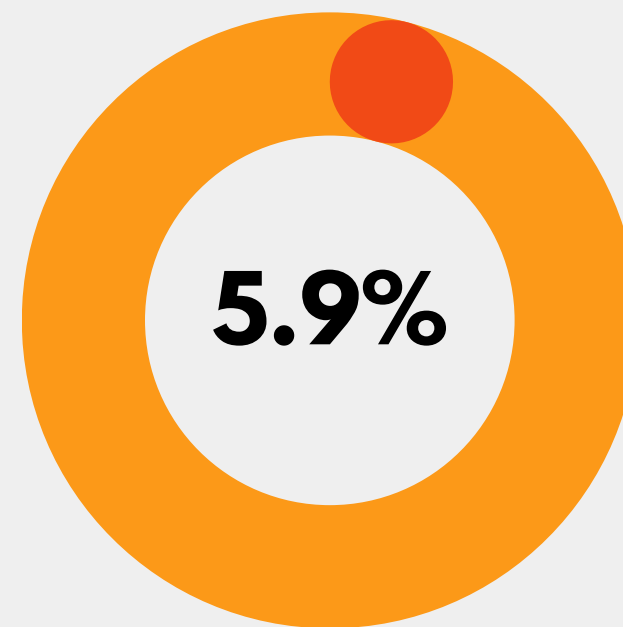
by age group



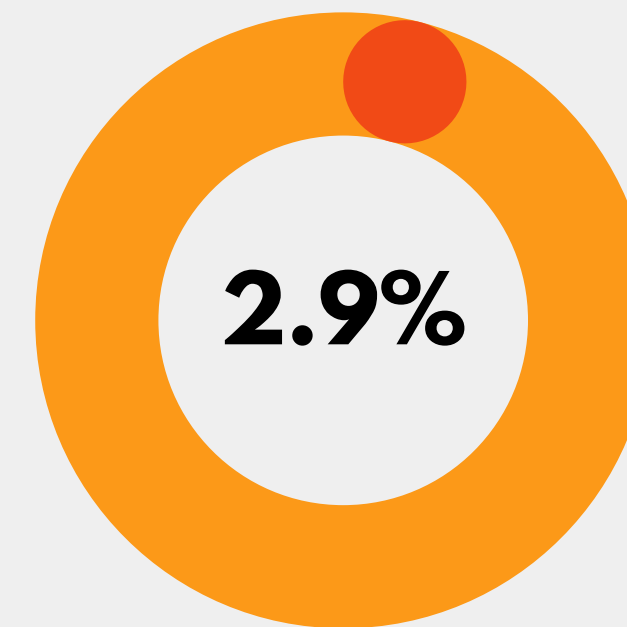
20-25



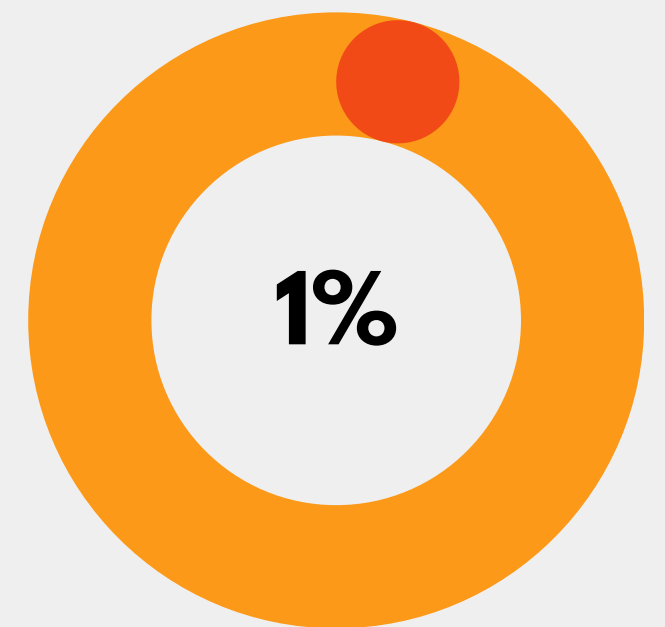
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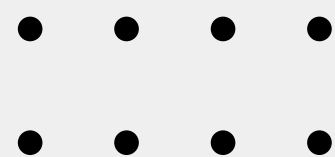
25-30

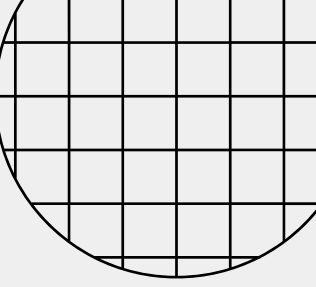


35-40



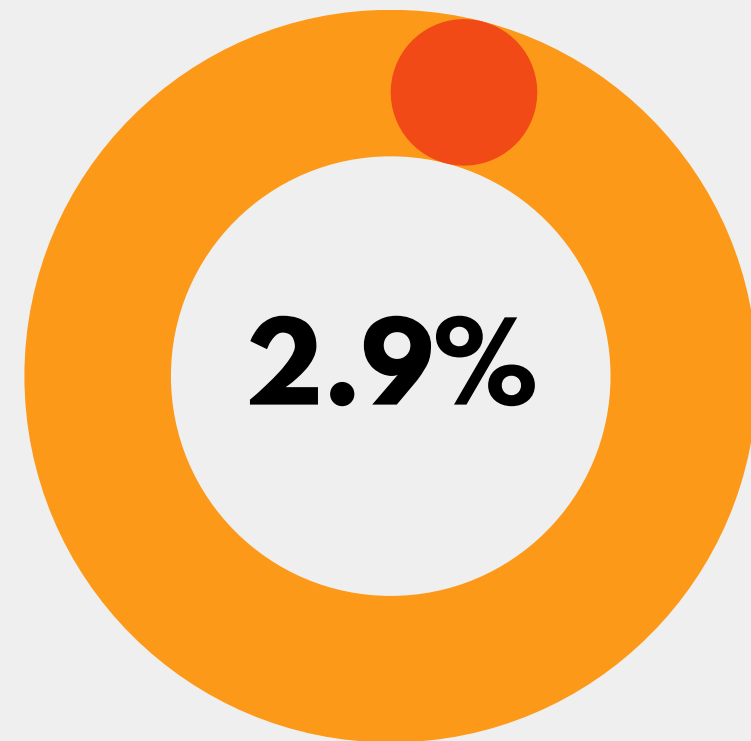
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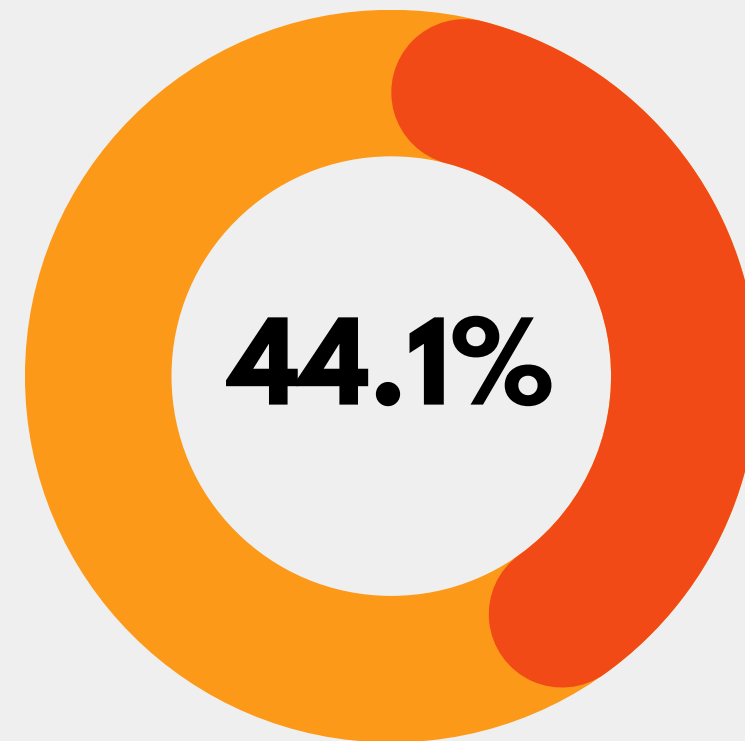


Dataset

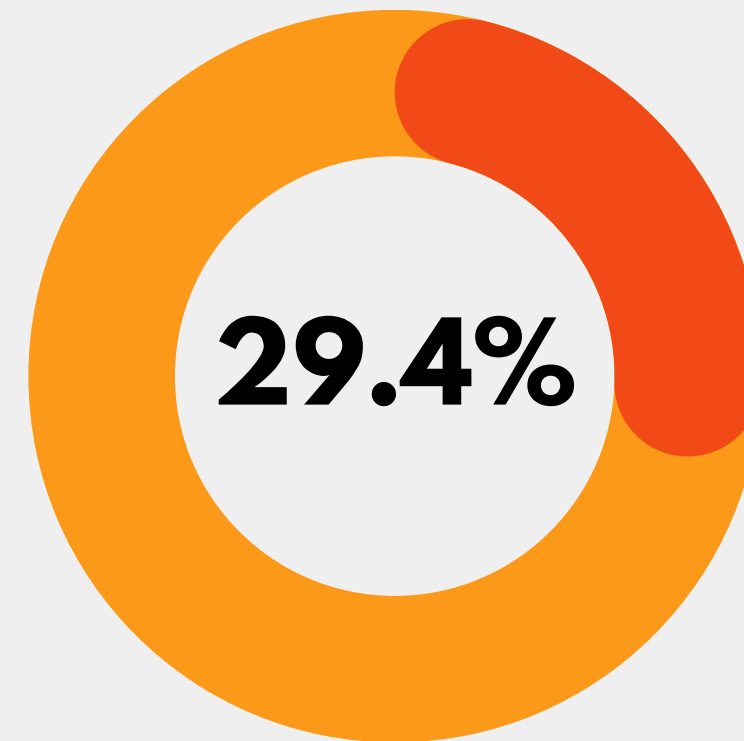
by social media usage



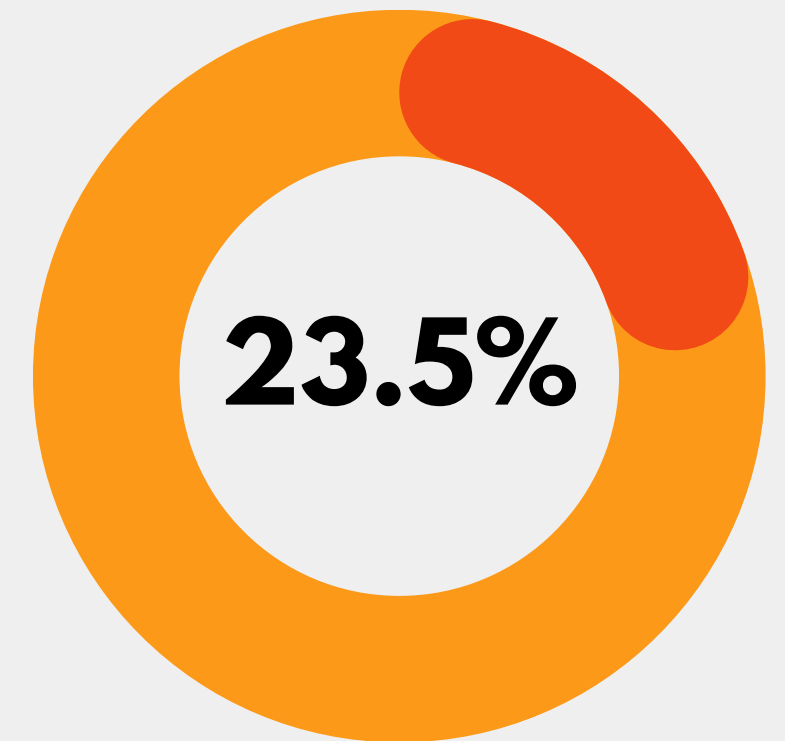
<1h



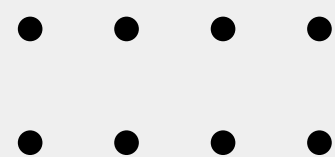
1-3h



3-5h

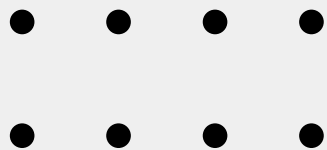
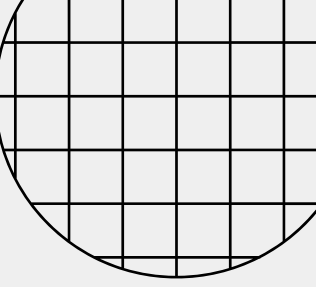
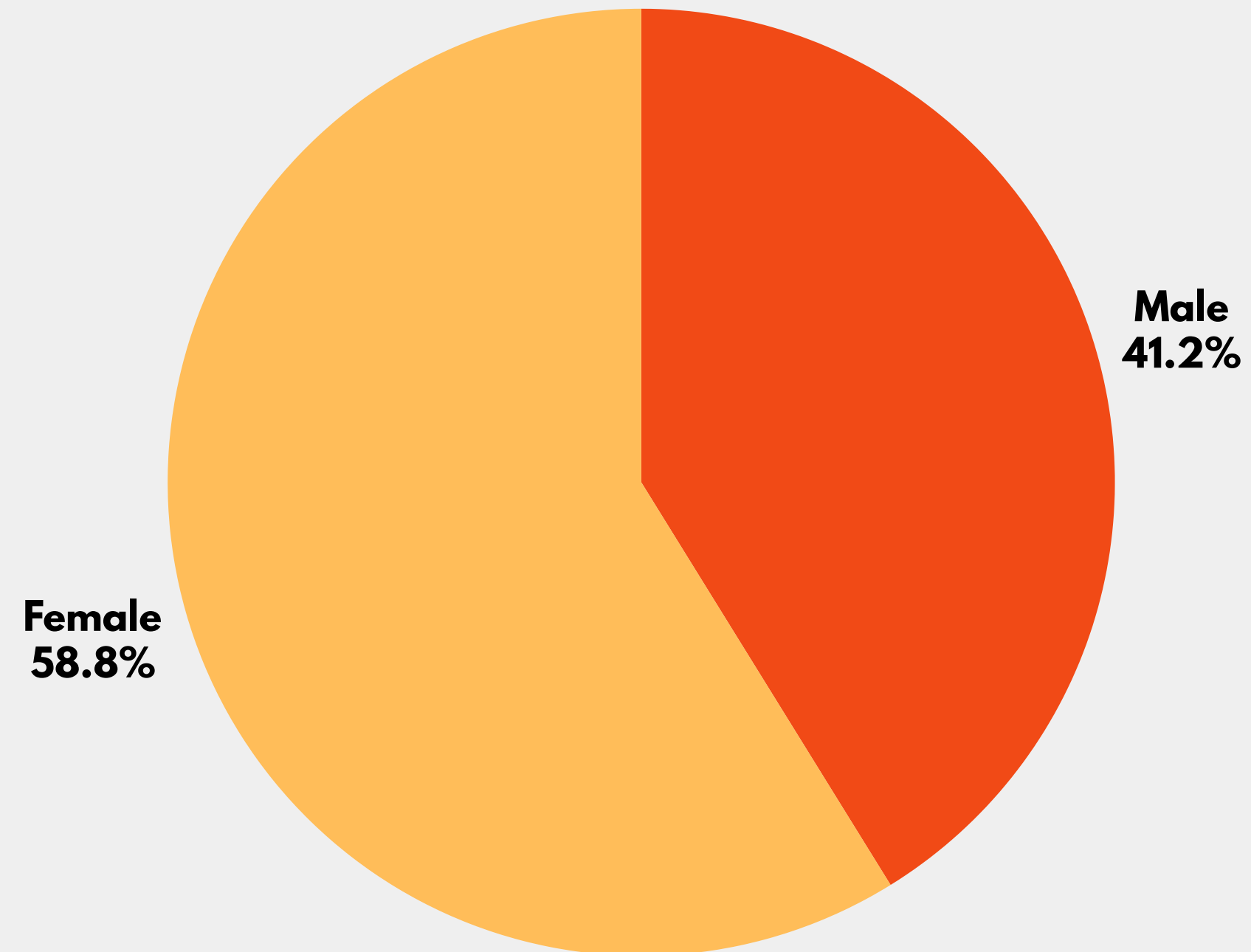


>5h



Dataset

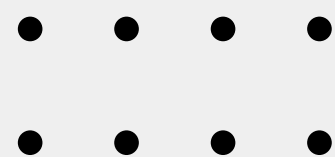
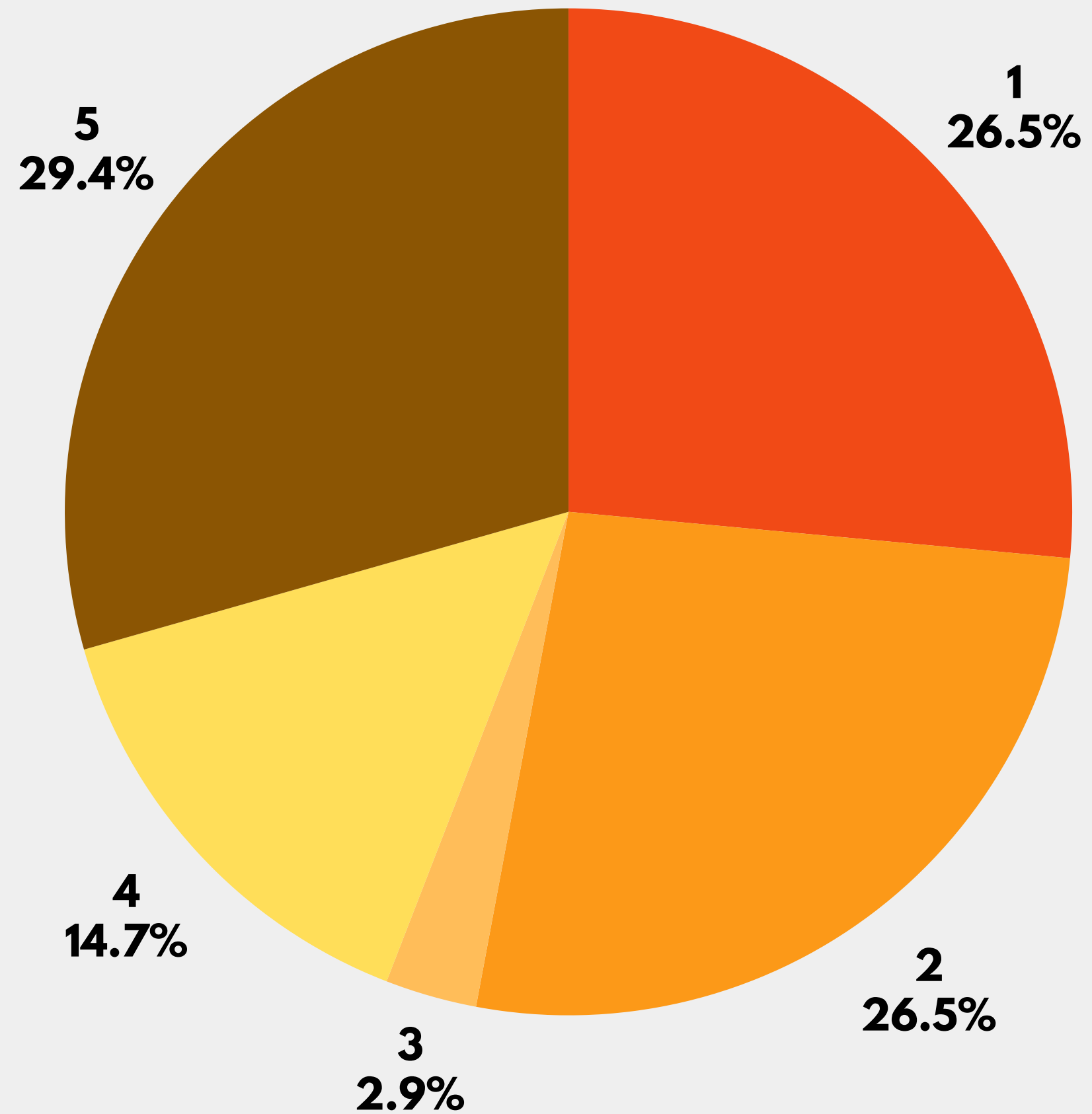
by gender



Dataset

Familiarity with Virtual Influencers

(Scale: 1 = Not at all familiar, 5 = Very familiar)



Treatment



Survey

1. Screening

Q1. How familiar are you with virtual influencers on Instagram?

Labels:

1 = Not at all familiar

5 = Extremely familiar

2. Perceived Trust Evaluation

Q3. This influencer seems honest to me

Q4. This influencer seems trustworthy to me

Q5. This influencer post seems ethical to me

Q6. This influencer seems sincere to me

Q7. This influencer post seems convincing to me

Q8. This influencer seems credible to me

Q9. This influencer post seems reasonable to me

Q10. This influencer seems questionable to me (*Reverse-scored*)

Q11. This influencer seems authentic to me

Labels:

1 = Completely disagree

5 = Agree



3. Endorsement Influence

Q14. How likely would you be to consider buying the item after seeing this post?

Labels:

1 = Very unlikely

5 = Very likely

Q15. This post caught my interest

Labels:

1 = Completely disagree

5 = Agree

4. Demographics and Confounders

Q16. How old are you?

Type: Multiple choice

- 19 and under
- 20–29
- 30–39
- 40–49
- 50 and older



4. Demographics and Confounders

Q17. What is your gender?

Type: Multiple choice

- Male (1)
- Female (2)
- Prefer not to say (3)

Q18. *On average, how many hours per day do you spend on social media?*

Type: Multiple choice

- Less than 1 hour
- 1–3 hours
- 3–5 hours
- More than 5 hours

Q19. *How often do you interact with influencers on social media (e.g., view, like, comment, share, follow)?*

Type: Multiple choice

- Never (1)
- Rarely (2)
- Sometimes (3)
- Often (4)
- Very often (5)





R Analysis



After loading all libraries, dataset, we pooled all variables of perceived trust and ran a t-test.

```
t.test(perceived_trust ~ influencer_type, data = data)
```

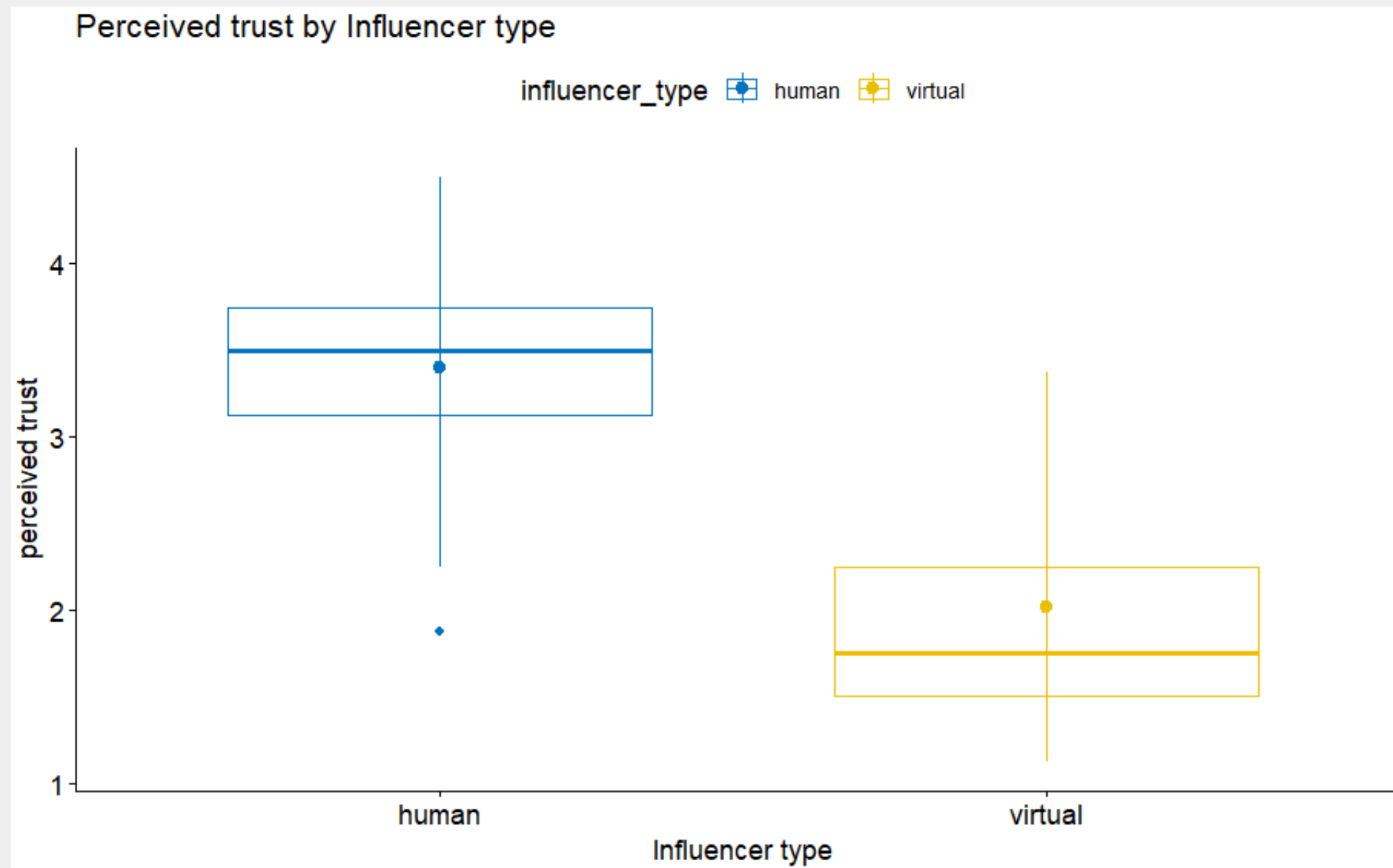
```
data:  perceived_trust by influencer_type
t = 5.8183, df = 31.99, p-value = 1.84e-06
alternative hypothesis: true difference in means between group human and group virtual is not equal to 0
95 percent confidence interval:
 0.9045457 1.8790678
sample estimates:
 mean in group human mean in group virtual
      3.404412          2.012605
```

There is a statistically significant difference in perceived trust between human and virtual influencers ($p < 0.001$).

Human influencers (mean = 3.40) generate significantly more trust than virtual influencers (mean = 2.01).

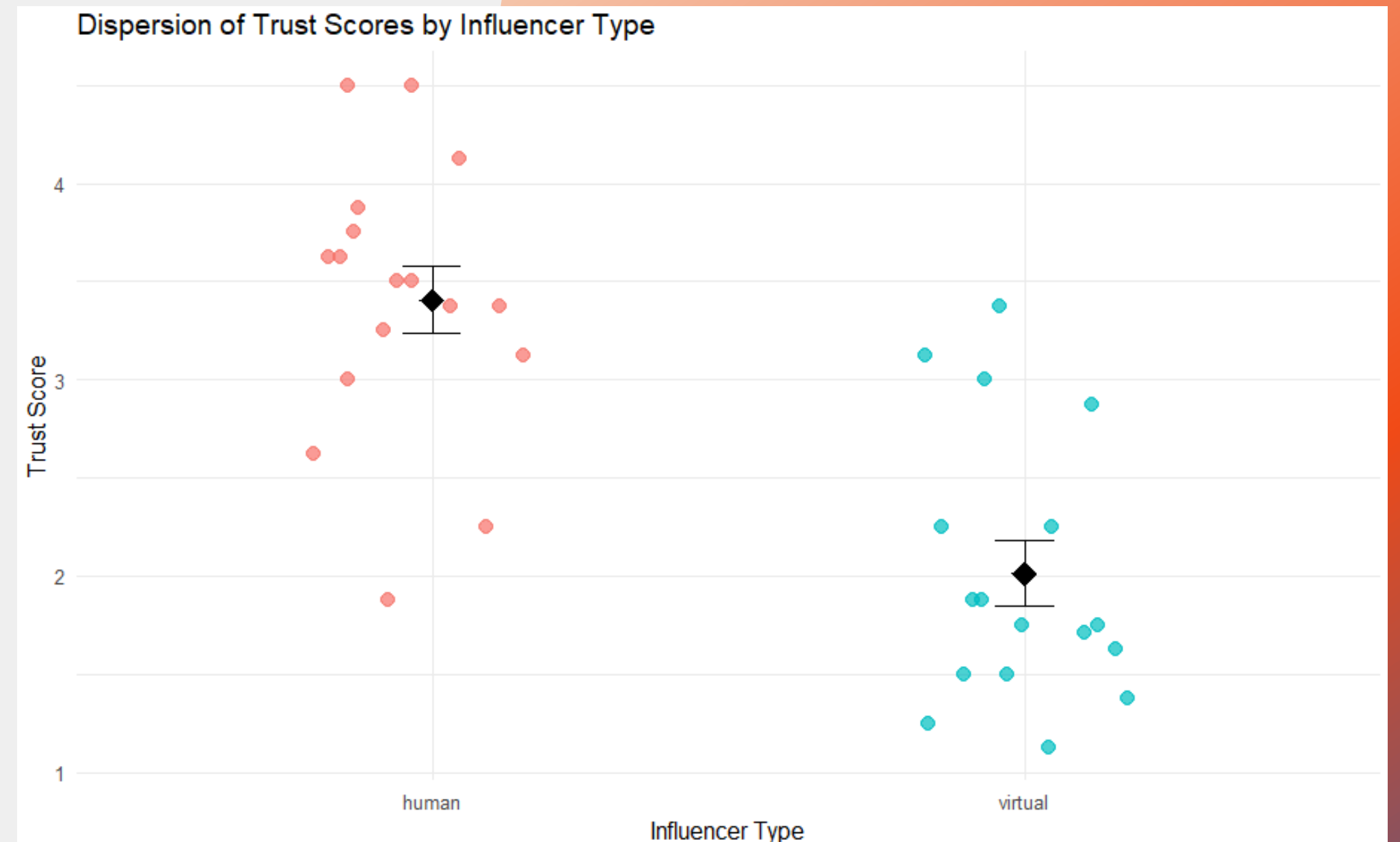
Visualisation

```
ggboxplot(data, x = "influencer_type", y = "perceived_trust",  
          color = "influencer_type", palette = "jco",  
          add = "mean_sd", ylab = "Confianza Percibida", xlab = "Tipo de  
Influencer") +  
  ggtitle("Confianza Percibida por Tipo de Influencer")
```



Visualisation

```
ggplot(data, aes(x = influencer_type, y = perceived_trust, color =  
influencer_type)) +  
  geom_jitter(width = 0.2, height = 0, size = 3, alpha = 0.7) + # scatter with  
  jitter  
  stat_summary(fun = mean, geom = "point", shape = 18, size = 5, color =  
"black") + # mean points  
  stat_summary(fun.data = mean_se, geom = "errorbar", width = 0.1, color =  
"black") + # error bars for SE  
  labs(title = "Dispersion of Trust Scores by Influencer Type",  
        x = "Influencer Type",  
        y = "Trust Score") +  
  theme_minimal() +  
  theme(legend.position = "none")
```



After assessing trust, we moved to purchase intention evaluation

```
t.test(endorsement_q14 ~ influencer_type, data = data)
```

```
data: endorsement_q14 by influencer_type
t = 5.7997, df = 26.422, p-value = 3.892e-06
alternative hypothesis: true difference in means between group human and group virtual is not equal to 0
95 percent confidence interval:
 1.253725 2.628628
sample estimates:
 mean in group human mean in group virtual
      3.470588          1.529412
```

The type of influencer also affects purchase intention.

Participants reported a higher intention to purchase after viewing a post by a human influencer (mean = 3.47) compared to a virtual influencer (mean = 1.53), and the difference is highly significant ($p < 0.001$).

Now, let's move to regression analysis to check if confounders affect the responses

```
modelo <- lm(perceived_trust ~ influencer_type + familiarity + age + gender +
social_media_hours, data = data)
summary(modelo)
```

Variable	Coefficient (β)	p-value
(Intercept)	3.49	0.00016
influencer_typevirtual	-1.20	0.015 *
familiarity	0.05	0.701

Variable	Coefficient (β)	p-value
age20–25	-0.26	0.462
age25-30	-0.76	0.211
age35-40	-1.30	0.123
age45 and older	-0.43	0.119
genderMale	-0.43	0.119

Variable	Coefficient (β)	p-value
social_media_hours3–5 hours	0.05	0.862
social_media_hours< 1 hour	0.17	0.824
social_media_hours> 5 hours	0.46	0.183

Interpretation

- The type of influencer is the only statistically significant predictor. Participants report significantly lower trust when the influencer is virtual, even after controlling for age, gender, social media usage, and familiarity.
- Other variables like age, gender, and social media use do not individually have a statistically significant effect on trust.
- However, the overall model has good explanatory power (Adjusted $R^2 = 0.50$), suggesting that these variables collectively help explain trust in influencer posts.

Then, we calculated the average perceived trust per age group and influencer type to identify any patterns by demographic.

```
data %>%  
  group_by(age, influencer_type) %>%  
  summarise(mean_confianza = mean(perceived_trust, na.rm = TRUE),  
            n = n())
```

Results

Across all age groups, human influencers consistently receive higher trust scores than virtual influencers.

The largest and most balanced group is the 20–25 age range, where the difference in trust is also evident:

- Human: 3.38
- Virtual: 2.00

In younger participants (under 20), the trend remains: human influencers are trusted more than virtual ones.

The older age groups have very small sample sizes (e.g., $n = 1$ or 2), so their results should be interpreted with caution.

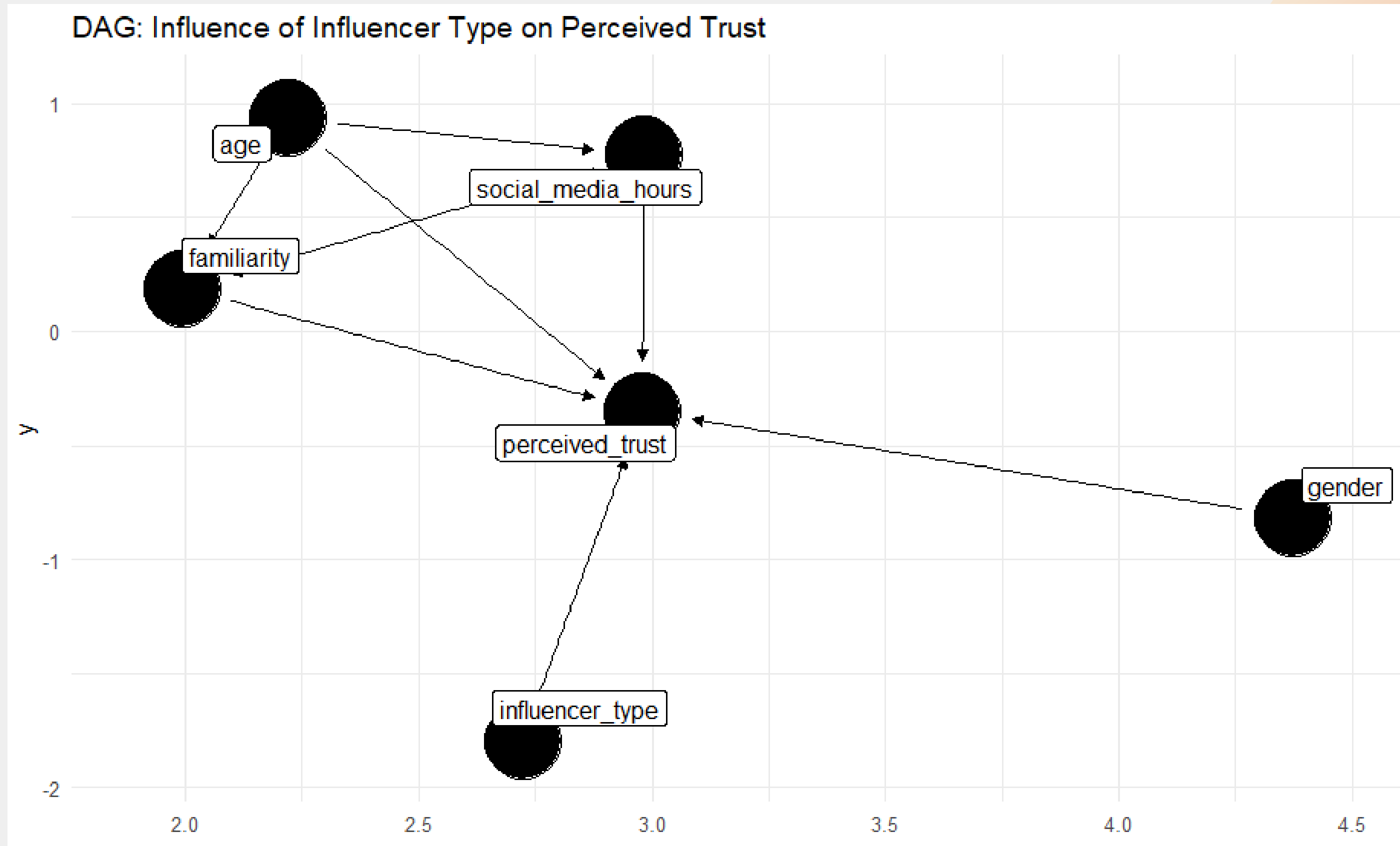
Regardless of age, human influencers tend to be perceived as more trustworthy. This effect is especially visible in the 20–25 age group, which represents the largest portion of the sample.

Now, let's create a DAG

```
dag <- dagify(  
  perceived_trust ~ influencer_type + familiarity + age + gender +  
  social_media_hours,  
  familiarity ~ age + social_media_hours,  
  social_media_hours ~ age,  
  exposure = "influencer_type",  
  outcome = "perceived_trust"  
)
```

```
ggdag(dag, text = FALSE, use_labels = "name") +  
  theme_minimal() +  
  ggtitle("DAG: Influencia del tipo de influencer en la confianza percibida")
```


Now, let's create a DAG



Final Thoughts

Our analysis:

1. Compares trust and purchase intent between virtual and human influencers
2. Controls for demographic and behavioral variables
3. Visualizes the causal logic with a DAG
4. Provides statistical evidence for the research question

Thank you

Do you have any questions?

