

DEVELOPMENTAL PATTERNS OF CHANGE IN THE INFLUENCE OF SAFE AND RISKY PEER CHOICES ON RISKY DECISION MAKING

Barbara Braams

Current Perspectives on Adolescent Risk Taking Symposium
Leiden, Feb 15th 2019

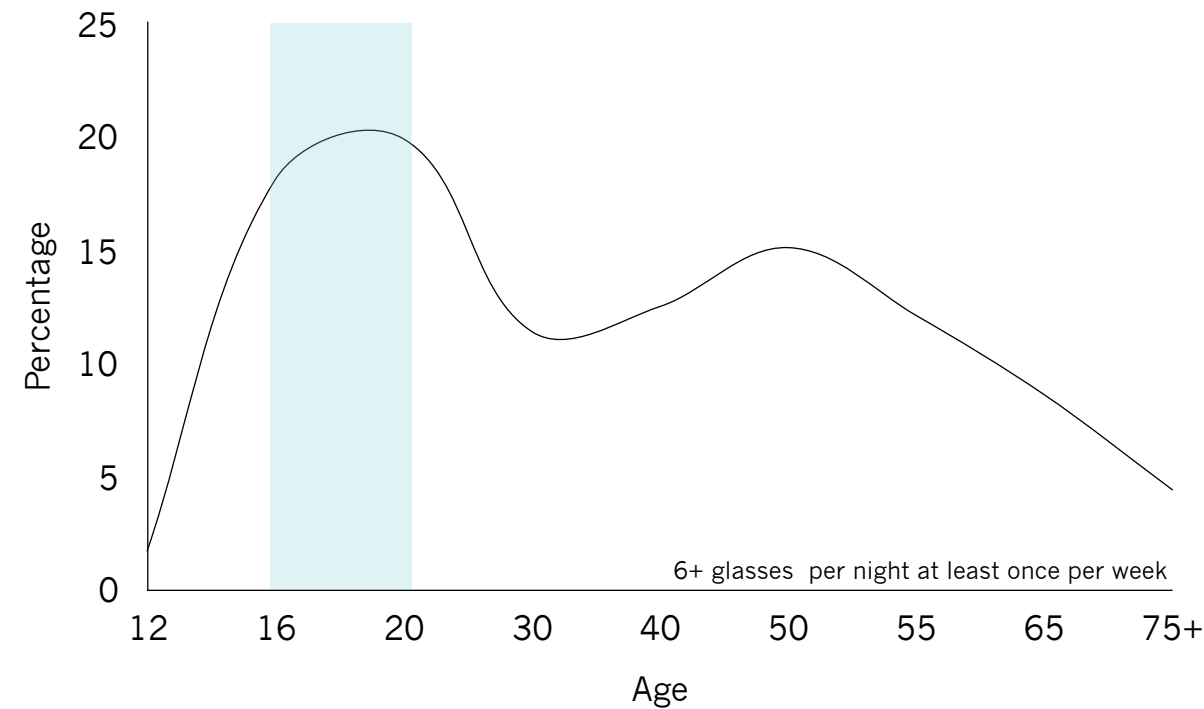


INTRODUCTION



Adolescence is the phase of the lifespan between childhood and adulthood. The onset of adolescence co occurs with the onset of puberty roughly between 10-12 years of age. The end of adolescence is broadly defined as a stable and independent role in society. Adolescence is a period of life associated with wide-ranging social, emotional, and cognitive development. The transition towards independence creates new challenges and new societal and cultural expectations.



PERCENTAGE HEAVY DRINKERS PER AGE GROUP (NL)



Centraal Bureau voor de Statistiek, 2016

One of the major changes observed in adolescence is an increase in risk taking behavior. When I talk about risk taking behavior in the real world I mean behaviors that can pose risks to our health such as binge drinking and speeding on the highway and criminal behavior. Engagement in these behaviors peaks during adolescence. Here you see an example of binge drinking that peaks around the age of 18. Some amount of risk taking behavior is normative, and important for adolescents to explore their environment and learn about the world. However, excessive amounts of risk taking can lead to unintended injuries and can have long lasting adverse consequences.

Peers influence risky decision making

TEEN DRIVERS AND RISK TAKING¹			
Number of Teen Passengers	0	1	2 or more
Driving Risk	Normal	2.5x more likely to take risks	3x more likely to take risks

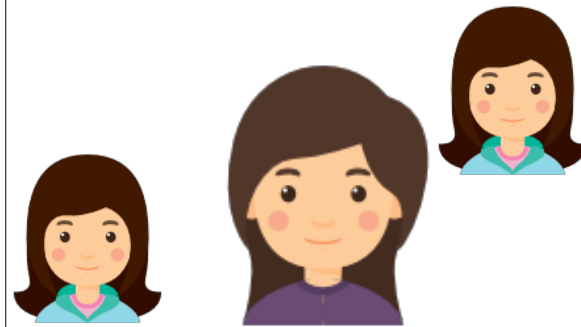
Adolescence is a time of social reorientation in which adolescents spend less time with their parents and start spending more time with their peers. The opinion of peers and belonging to the group become highly important for adolescents. One way peers influence adolescent behavior is in risky decision making. In the real world we see this for instance in driving. Adolescents are 2.5x more likely to take risks when they are with a teen passenger in the car compared to when they are driving alone and even 3 times more likely to take risks when there are 2 or more teen passengers in the car.

Increased risk taking in the presence of peers is also observed in alcohol use, adolescents drink more alcohol when they are with their friends and in criminal behavior, the number of co offenders is highest for late adolescents and early adults. However, it is unknown exactly why adolescents take more risks when they are with their peers.

In a real life situations there are many factors that play into the behavior. To better understand why adolescents increase risky behavior we can try to decompose the underlying factors that give rise to this behavior. Two factors in this case are social influence and decisions.

SOCIAL INFLUENCE

- ▶ Peer encouragement
- ▶ Peer observation
- ▶ Peer presence
- ▶ Peer choices



DECISIONS

- ▶ Expected utility
- ▶ Risk (known probabilities)
- ▶ Ambiguity (unknown probabilities)



Let's have a closer look at social influence and decisions.

Social influence is a broad term and can encompass many different types of peer involvement. In the case of driving the peers are watching the adolescent make decisions, they can encourage that behavior. This is different from a peer who is merely observing, but not encouraging, or a peer that is present but not observing. Lastly, we can have information about what peers did in a similar situation and the peer does not even need to be present for this. We can imagine that these types of peer involvement\ have different effects on behavior.

Just as with social influence there are also many types of decisions. In the case of driving there are many things that should be taken into account to drive. You are making continuous risk assessments and and flexibly adjust behavior based on the conditions. When we decompose decisions into their parts we can look at the influence of the expected utility, or value of the different choice options, we can look at the riskiness or outcome variability of the options and the ambiguity of the choice options.

I will discuss a study in which we used an economic decision science approach to test how information about others' choices influences risky and ambiguous decision making. In this study the type of peer influence we investigated is information about others' choices. An example is when an adolescent has been drinking at a party and he is faced with the choice to either drive home or arrange a different form of transportation, their choice might be influenced by what others have done previously in a similar situation.



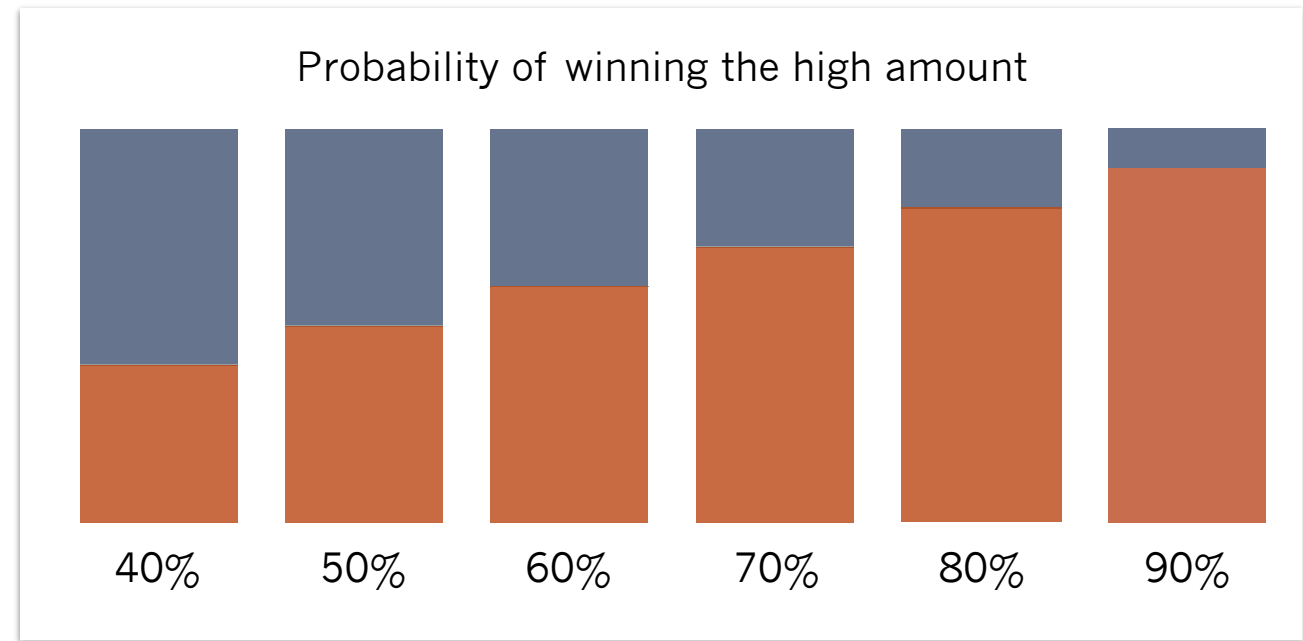
We presented participants with a series of choices. On each round participants can choose one of two lotteries. The colors of the bar represent the chance of winning the amount of money in that color. Choices were systematically varied in chances of winning the high amount of money. In this example, the expected value of both these options is the same, but they differ in riskiness. Riskiness is defined as the variability in outcome.



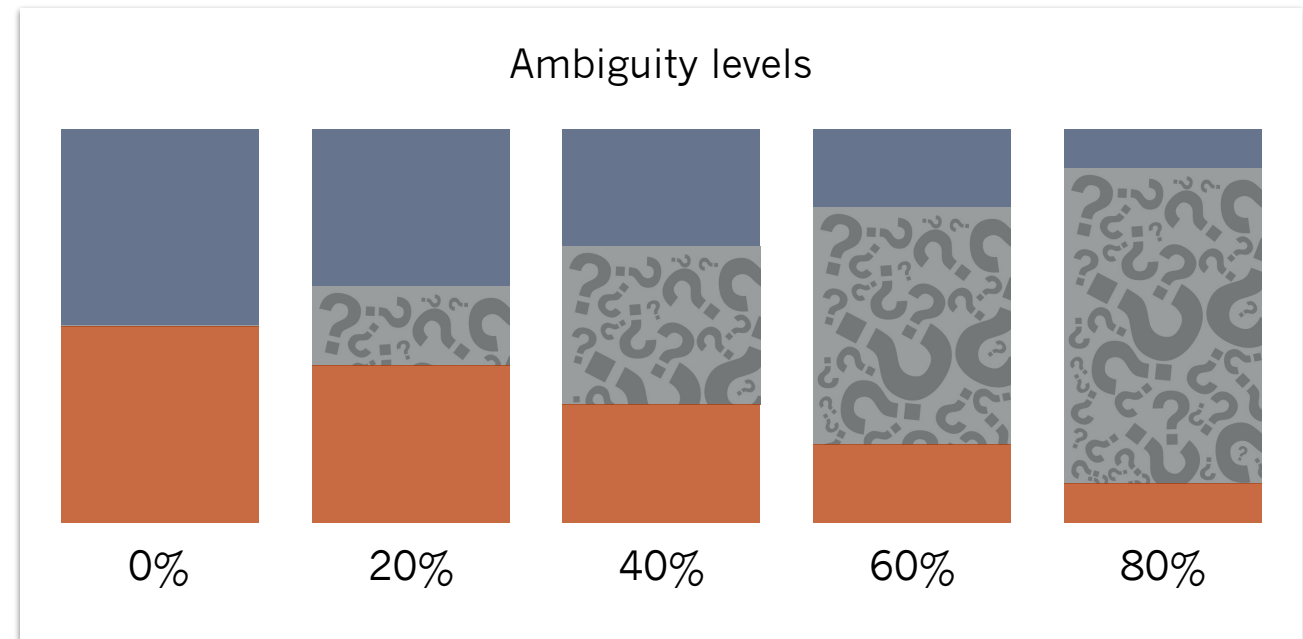
One of the options is a safer option. If you choose this lottery, it doesn't really matter if blue or red is the winning color, you know that you will get approximately two dollars.



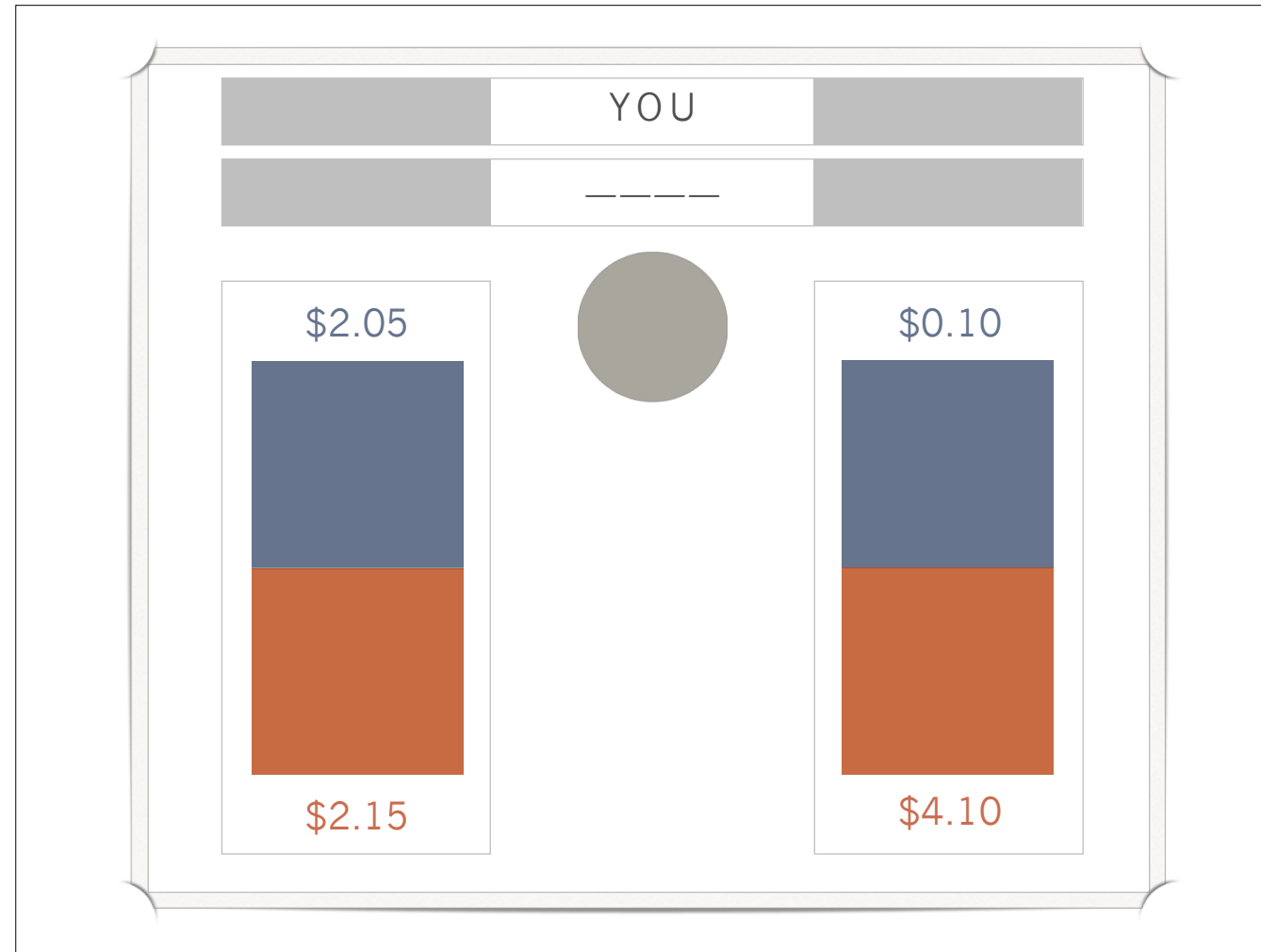
The other option is the more risky option. In this case it is less certain what the outcome will be and it can vary between 10 cents or \$4.10



The probabilities of winning the high amount of money varied between 40% and 90% in increments of 10%



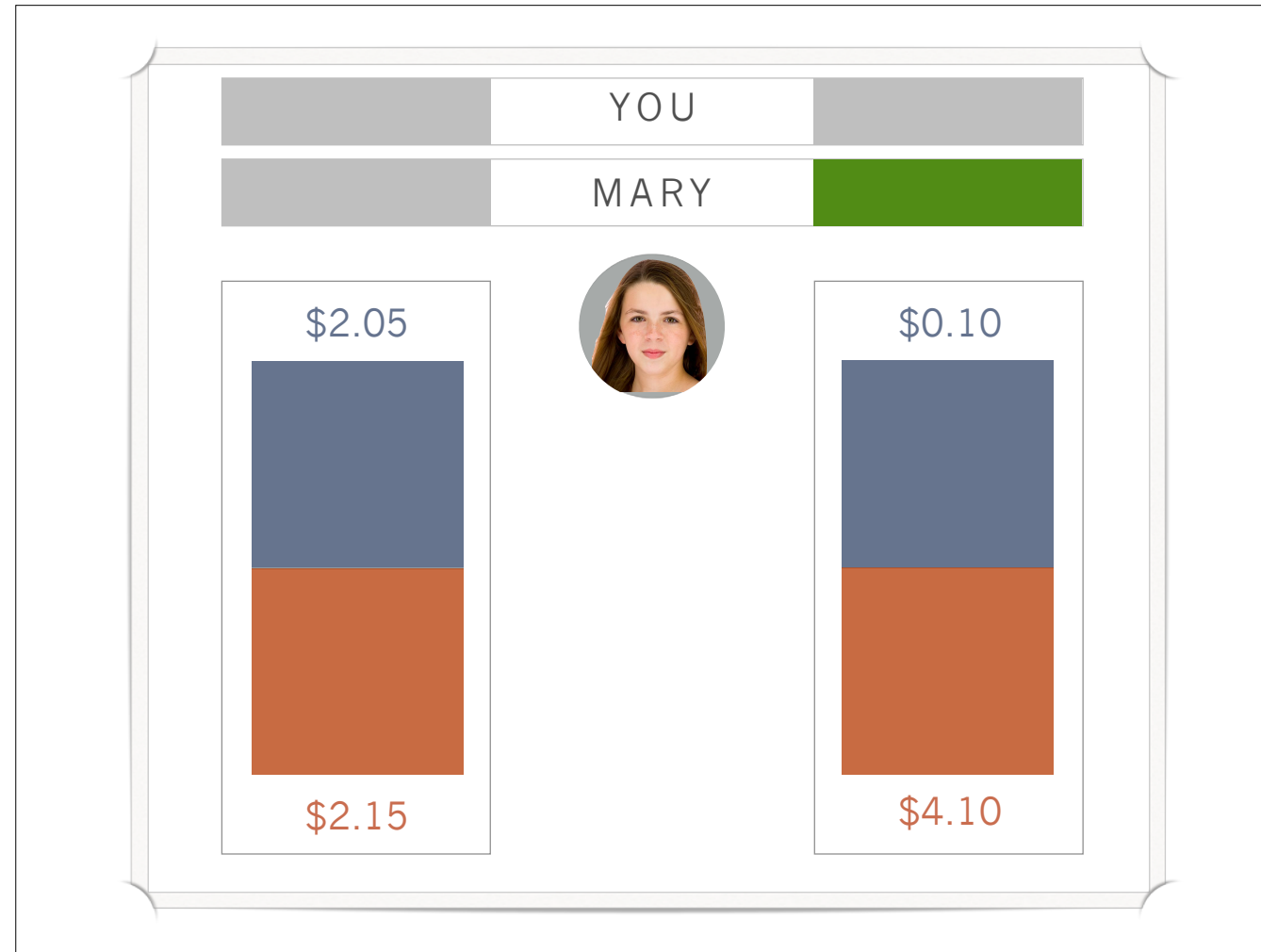
We also introduced ambiguity into the gambles. Ambiguity was operationalised by occluding part of the bar. The color under the bar could be red, blue, or a combination of both colors, thereby introducing uncertainty, ambiguity, about the chances of winning. Ambiguity levels varied between 0% and 80% in increments of 20%



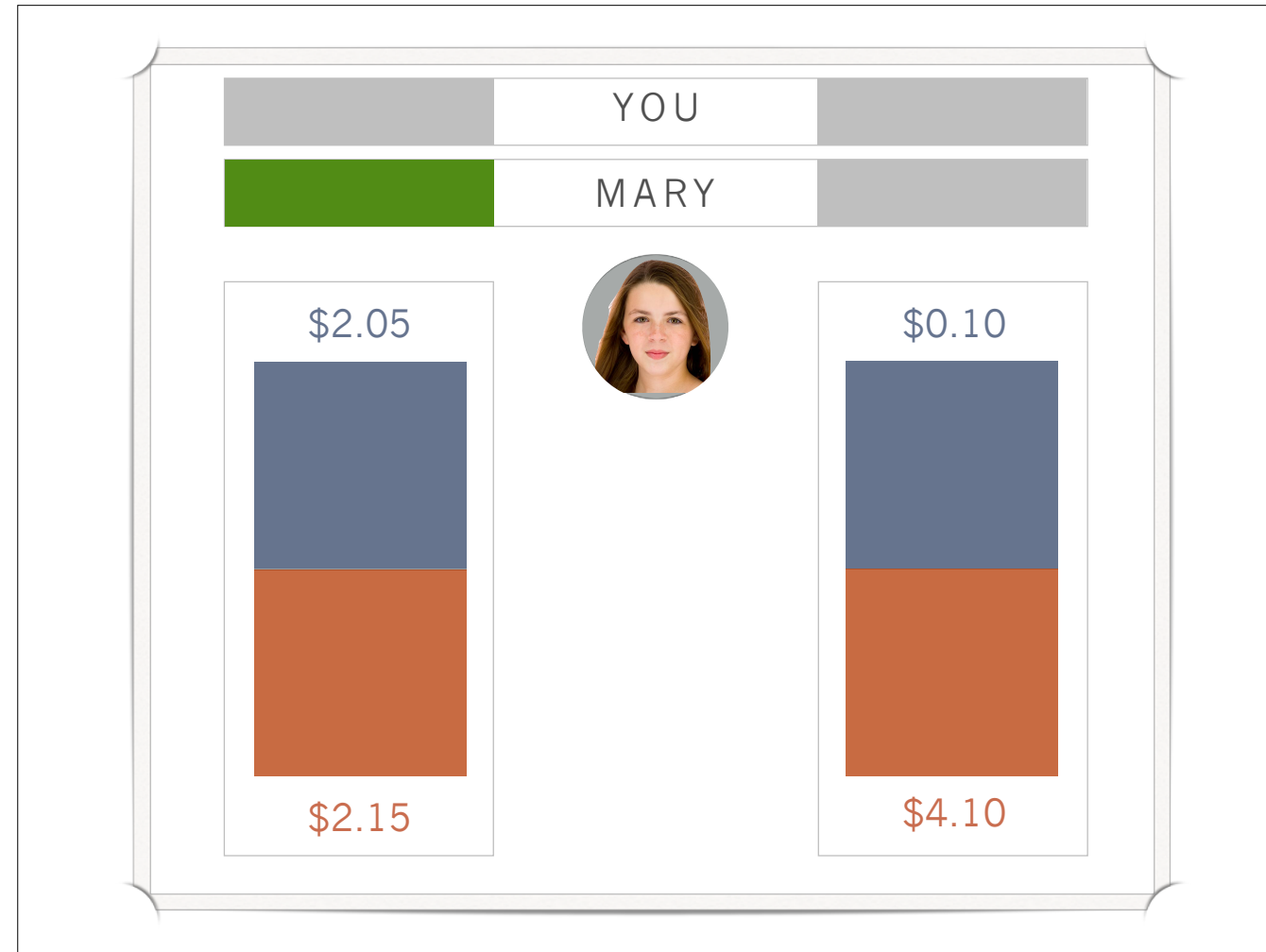
As a baseline we established in what percentage of the time participants choose the risky option when they play this game. Participants are presented with the two lotteries and they can make their choice.



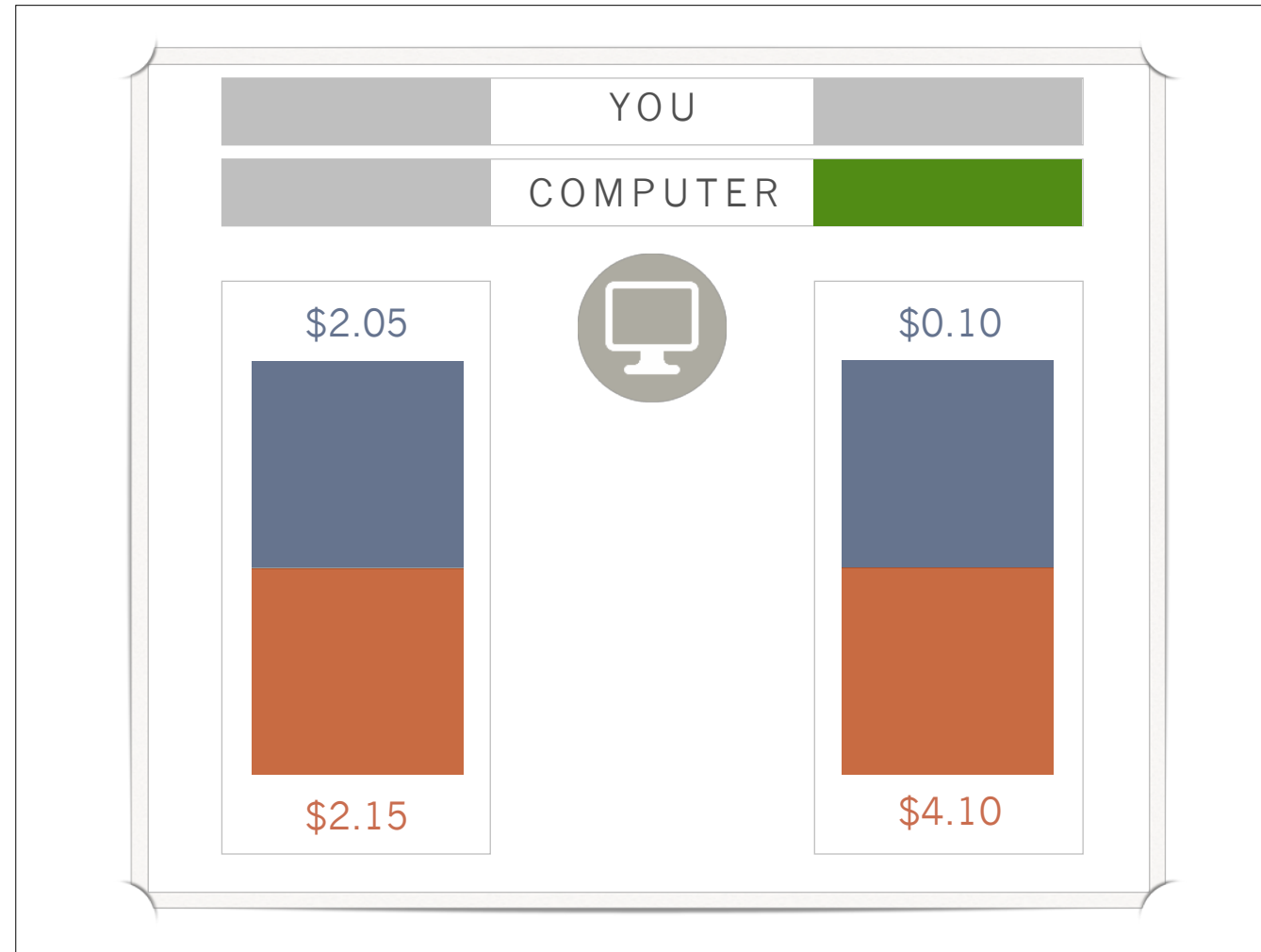
After they've made their choice they see a visual feedback and then the game continues with the next round.



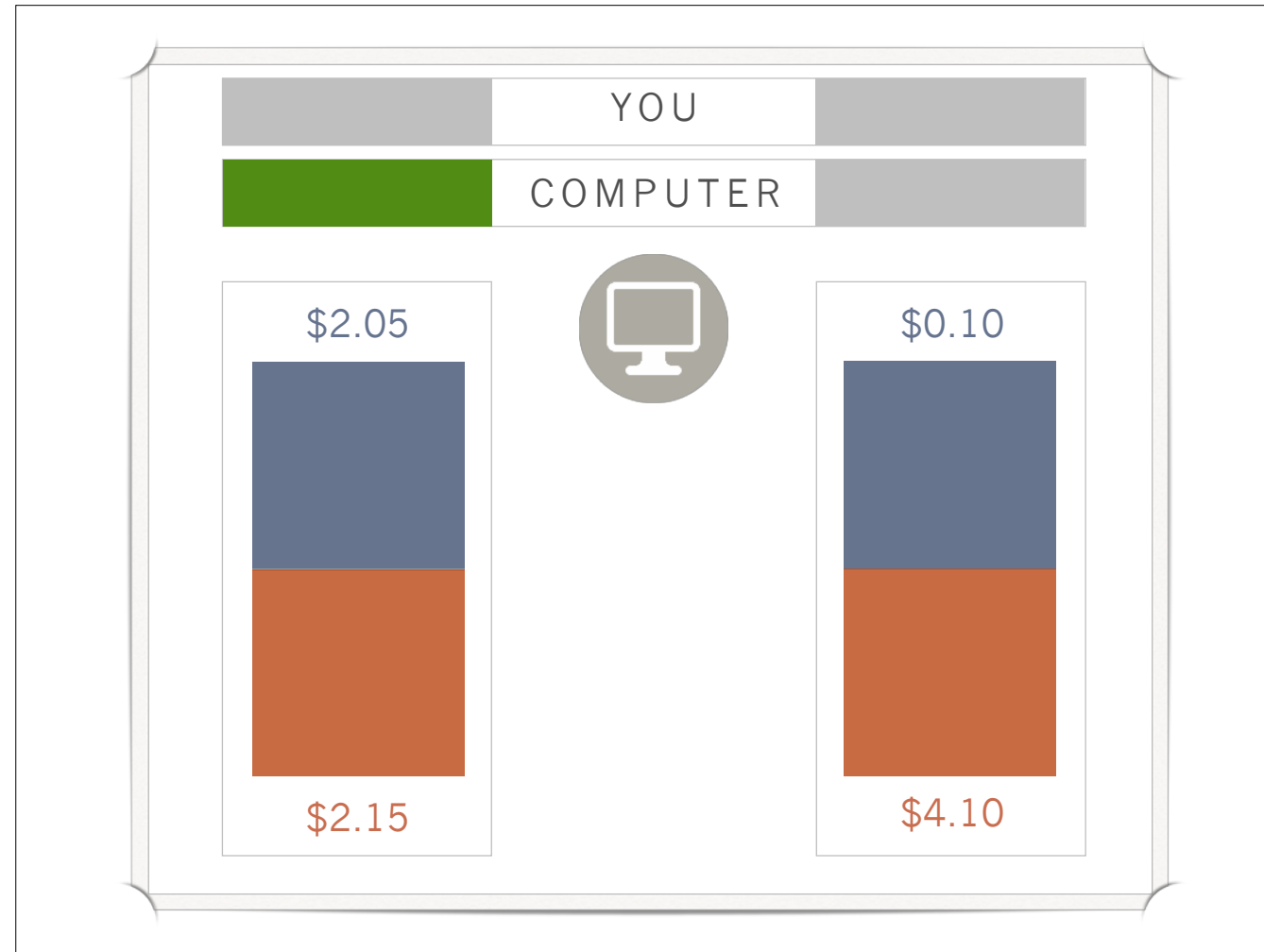
On some of the rounds participants can see choices of previous participants. The other participants were age and gender matched and participants could choose three others of whom they wanted to see their choices. Importantly, participants were never instructed to follow choices of others. Other participants could choose the risky option, as shown here.



Or the safe option



To isolate social processes and test that changes in decisions were not just based on availability of additional information, we also included a computer condition. Participants were told that the computer generated random choices and they could sometimes see risky choices by the computer



And other times safe choices.

PARTICIPANTS

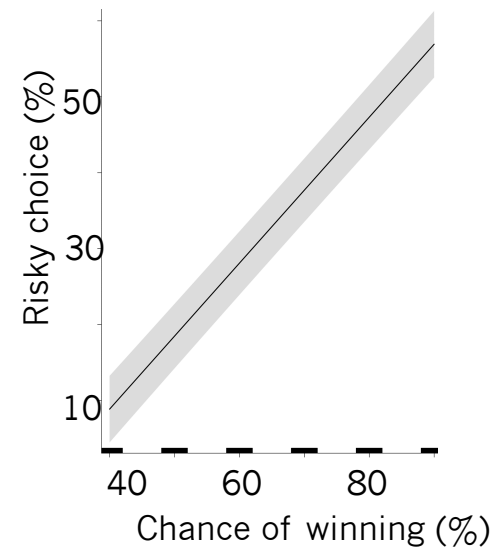
- ▶ Total included: 99 participants (47 females)
- ▶ Mean age 17.11, Age range 12 - 22 years old

In total we included 99 participants between the ages of 12 and 22.

NON-LINEAR MIXED EFFECTS MODELS

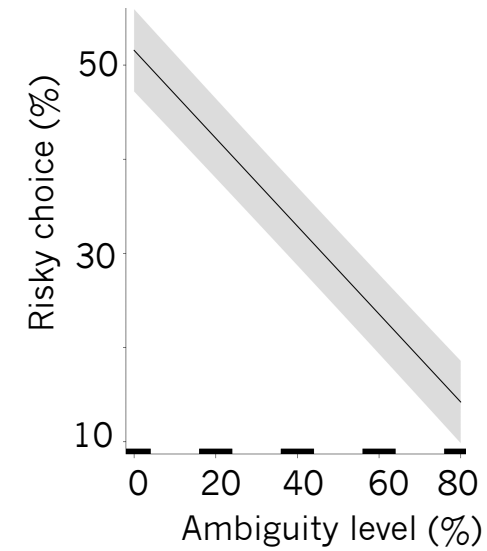
- ▶ Model fitting procedure
 - ▶ Null model
 - ▶ Linear model
 - ▶ Quadratic model
- ▶ Preferred models:
 - ▶ Lowest AIC value

SOLO CONDITION



More risky choice with increased chance of winning

$B = 96.10$; $t(5839) = 34.55$; $p < .001$



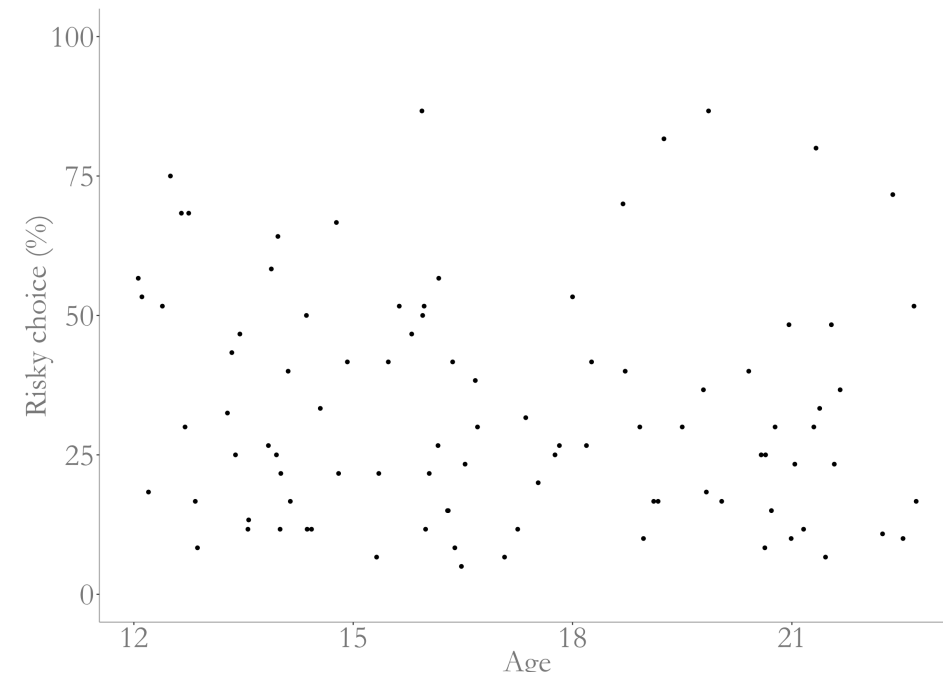
Less risky choice with increased ambiguity

$B = -46.67$; $t(5839) = -27.79$; $p < .001$

Braams et al. - Dev Sci, 2019

In the solo condition participants are more likely to select the risky option when the probability of winning increases, as the probability of winning increases, the risky option become the mathematically preferred option and participants understand this contingency. Participants are less likely to select the risky option when the ambiguity increases. This is in line with previous research showing that most participants show ambiguity aversion.

SOLO CONDITION

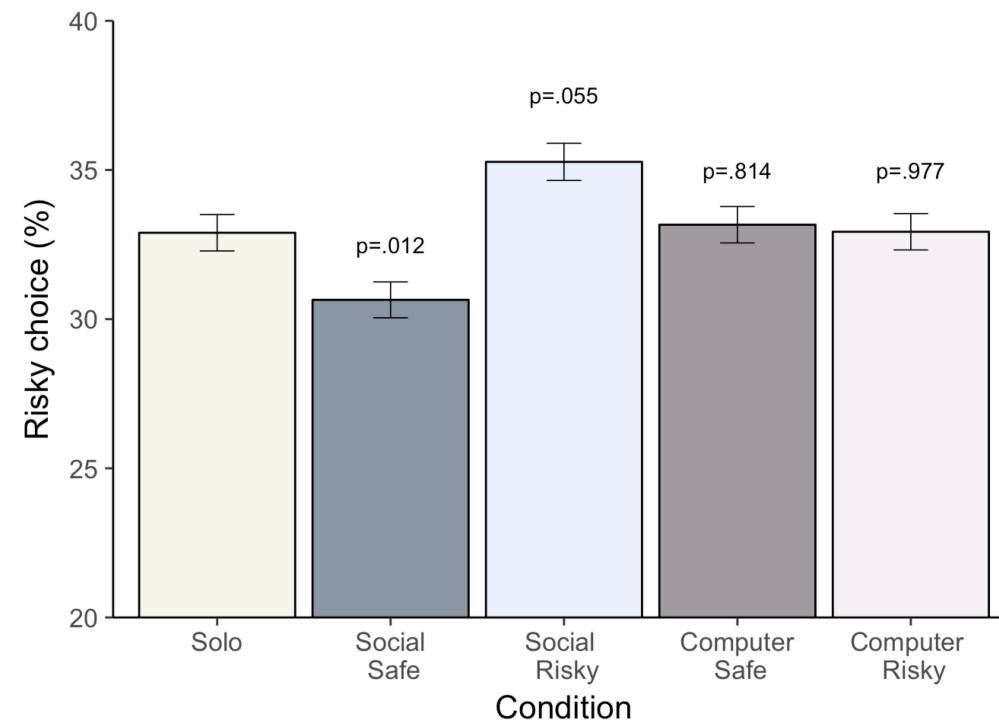


No effect of age

Braams et al. - Dev Sci, 2019

Here we see the percentage risky options chosen on the y axis and age on the x axis. We did not find evidence for adolescents choosing the risky option more often than other ages in the sample.

SOLO VS INFLUENCE CONDITIONS



all p values against solo condition

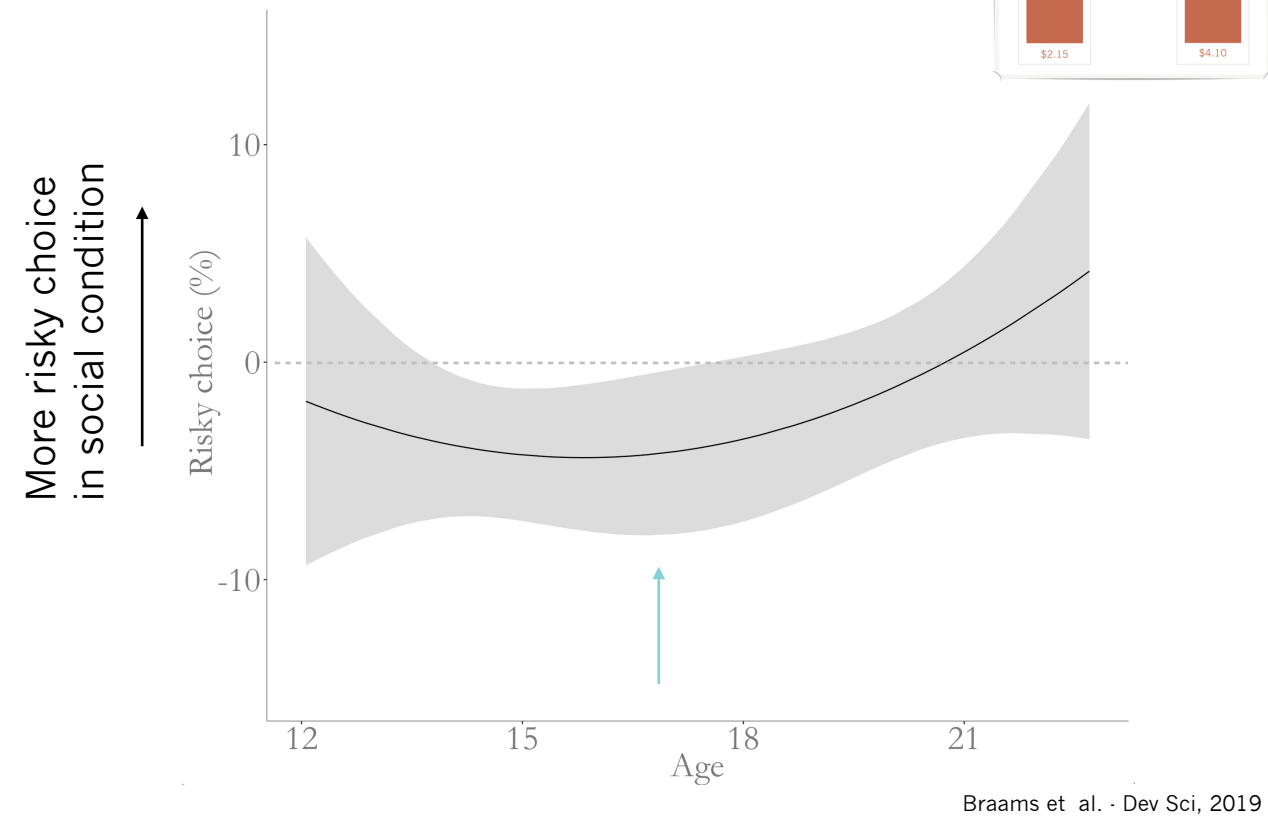
Braams et al. - Dev Sci, 2019

Here you see a graph with on the x axis condition and on the y axis percentage of risky choices in the task. When participants play this game by themselves, without any additional information they choose the risky option on approximately 32% of the lotteries.

When they are presented with information about other participants' previous choices participants follow these choices, meaning that, compared to the solo condition, participants make less risky choices when they see that someone else chose the safe option, and they make more risky choices when they see that the other participant chose the risky option.

This effect was not driven by availability of additional information since choices were not different from the solo condition when the computers' choices were presented.

SOCIAL INFLUENCE - OTHER CHOOSES SAFE

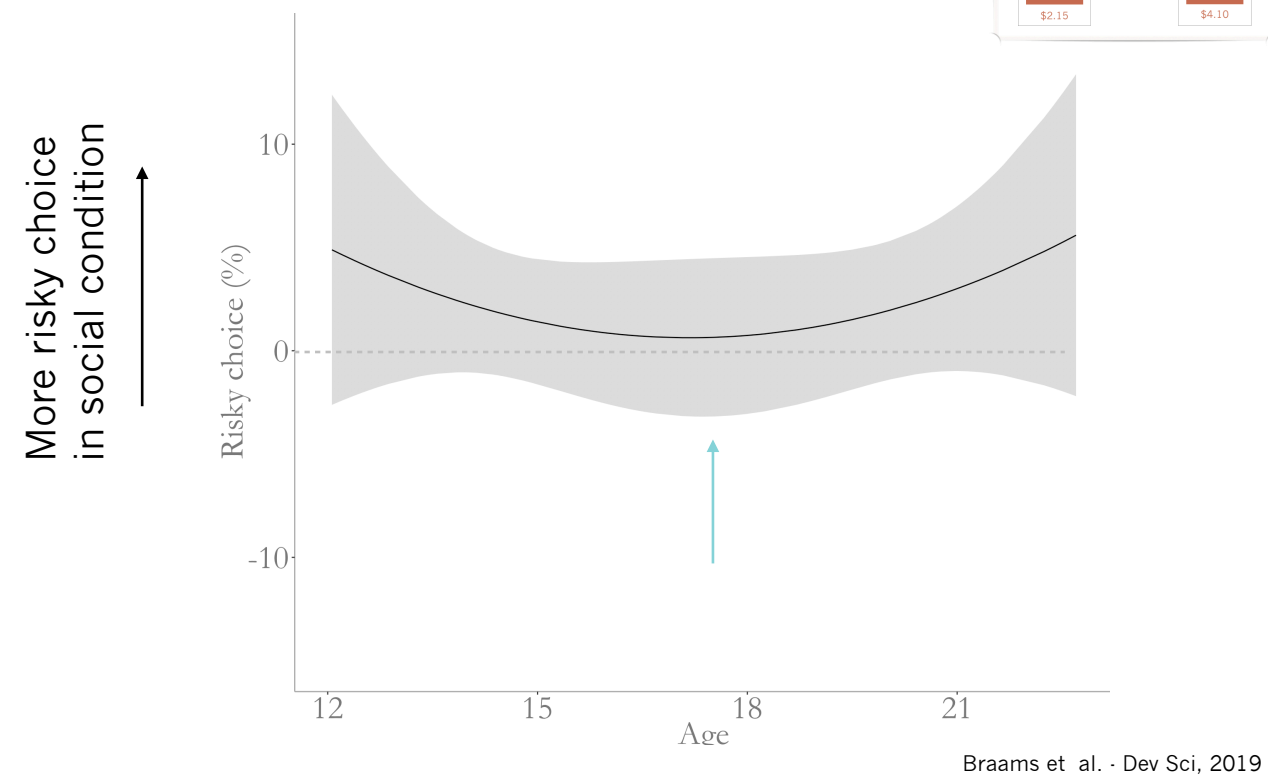


To test developmental patterns of social influence we compared choices in the social influence conditions to choices in the solo condition. Values above zero indicate more risky choices in the social condition.

Again we fitted linear and quadratic models and selected the best fitting models.

Model comparisons showed that the best fitting model was a quadratic model for both social conditions. When the other participants chose safe, old adolescents are most likely to follow this choice.

SOCIAL INFLUENCE - OTHER CHOOSES RISKY



When the other participant chose the risky option the older adolescents were least likely to follow this choice. This was contrary to our expectations since adolescents take more risks when they are with their peers in real life. However, when we think about the type of social influence presented in this task this make more sense. In the current study participants receive information about others' choices. Although this type of social influence is present in real life, it is different from for instance peer encouragement. One of the ways these types of social influence differ is that in the case of peer presence reputational factors come into play, that are absent when making choices alone.

DISCUSSION

DISCUSSION

No simple heuristic for increases in risky decision making under social influence

Adolescent peer influence is constrained to certain types of peer involvement

The take away message from this study is that there is no simple heuristic for increases in risky decision making under social influence. Different types of social influence can have very different effects on behavior. When we study the social context it is important to clearly define what type of social influence we are studying.

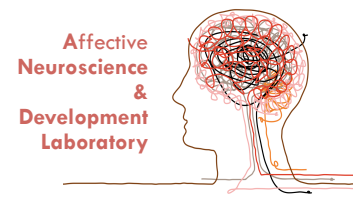
THANK YOU!

Thanks to:

Leah Somerville
Juliet Davidow
Cory Vidal
Kat Kabotyanski
Members of the AND Lab

Funding:

National Science Foundation (NSF)
Netherlands Organization for
Scientific Research (NWO)



b.r.braams@vu.nl | www.barbarabraams.nl