

Schelling Games at UChicago

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Author Note

This manuscript is for educational purposes only. This document and all other content in the parent repository was created as a demonstration of a “finished product” for the class Data to Manuscript in R at the University of Chicago. The repo is publicly available on GitHub: <https://github.com/nrdowling/schelling>. The survey and responses may also be used to stimulate discussion in lessons about Schelling’s focal points and coordination games, with the caution that this should in no way be considered a rigorous empirical study.

The authors made the following contributions. Natalie Dowling: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing; Dee Tooem: Data Preparation.

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Abstract

Thomas Schelling introduced the concept of “focal points” in *The Strategy of Conflict* with the intention of expanding the contemporary perspectives of game theory to include cooperative, not just competitive, games in human decision making. In this brief report, we consider focal points from a cognitive science perspective. We present data from an informal survey mimicking Schelling’s early (and also quite informal) study in *The Strategy of Conflict*. We find similar trends to Schelling’s original survey, reinforcing important foundational principles about implicit coordination and mutual salience. We discuss our findings as they relate to nonverbal communication and how these concepts may be extended to further our understanding of coordination in everyday conversation.

Keywords: coordination, focal points, mutual salience, Schelling, conversation

Word count: X

Schelling Games at UChicago

Thomas Schelling introduced the concept of “focal points” in Schelling (1960) with the intention of expanding the contemporary perspectives of game theory to include cooperative, not just competitive, games in human decision making. Though his work certainly proved influential in this regard, concepts of focal points and coordination games have found relevance well beyond game theory and or economics as a whole. From improvisational music (Clément Canonne, 2013) to urban planning (Rondinelli, 1973), from human-computer interfacing (Wong, Volonte, Liu, Ebrahimi, & Babu, 2023) to linguistic anthropology (Brown & Levinson, 1993), from social stereotyping (Yoon & Hollingshead, 2010) to online gaming (Ross & Collister, 2014), elements of Schelling’s framework of coordinated decision-making seem ubiquitous.

In this brief report, we consider focal points from a cognitive science perspective. We present data from an informal survey mimicking Schelling’s early (and also quite informal) study in *The Strategy of Conflict*. We discuss our findings as they relate to nonverbal communication and how these concepts may be extended to further our understanding of coordination in everyday conversation.

Focal points (also called Schelling points) were first conceptualized within in the field of economics. Shelling noted that by focusing on zero-sum or fully competitive behavioral scenarios, game theory had failed to account for many real-word games whose outcome rested on successful coordination, not competition, among multiple players. In the context of coordination games, Schelling’s focal points are the salient solutions that players tend to choose due to their intuitively recognizable or, more often, socially shared nature. Critically, players tasked with coordination choose these options even in the absence of explicit communication.

Since being introduced in game theory, focal points have seen broader application across the social sciences. In social psychology, focal points offer an explanation for the

natural solutions individuals find in social coordination problems where multiple choices are equally valid, as individuals may rely on common expectations or cultural cues to make decisions that lead to successful coordination. Social norms, traditions, and conventions contribute to the emergence of focal points, and they showcase how individuals rely on shared understanding to achieve coordination without explicit negotiation. This concept sheds light on the intricate ways in which human behavior and decision-making are influenced by social context and the desire to align with others.

These principles of implicit coordination are clearly applicable to relatively broad real-life contexts, such as meeting someone in a crowded place, deciding on a meeting time without prior communication, or determining where to sit in an auditorium. However, they may additionally apply to narrower contexts we might typically associate with explicit coordination, such as face-to-face conversation. In conversation, we use speech (or sign language) to express meaning “on-the-record,” but conversational interaction consists of much more than formal language. “Off-the-record” non-linguistic signals allow interlocutors to send highly informative but implicit messages alongside explicit meaning in speech. Nonverbal resources like co-speech gesture and paralinguistic resources like intonation can serve critical pragmatic functions. These tools make can conversation more efficient by allowing addressees to make inferences about speaker intention and meaning based on contextual cues.

In the context of everyday interaction, the significance of focal points is tightly linked to common ground. In simplest terms, conversational common ground is the shared knowledge, beliefs, assumptions, and experiences that participants in a face-to-face conversation believe to be mutually understood. At one level, common ground refers to common *knowledge*. If all interlocutors know that they have all been invited to Anna’s birthday party next Saturday, they may discuss the presents they plan to bring without explicitly mentioning who Anna is, why they would be giving her presents, or the deadline for buying a present for the party. These assumptions are localized to this group in this

conversation on this topic, but there are also generalized social assumptions at play. The party-goers know that presents are given for birthdays, that both the invitees and the host will be at the party, that the presents will be given to the host at the party, that presents should be appropriate for what the host would want to receive, etc.

Conversational common ground also encompasses emergent properties of the interaction, guided by cultural expectations and linguistic systems. The party-goers may refer to Anna as the “birthday girl” or simply “her” rather than naming her at each reference. One interlocutor may ask a question and expect to get an answer that is prompt, relevant, and truthful, given that all interlocutors are assumed to follow principles of English pragmatics and conversational organization. Common ground, both that which is present at the initiation of the conversation and that which emerges as a product of conversation, allows interlocutors to disambiguate and infer meaning with focal points. When a party-goer says, “I really hope she likes it,” the listeners face multiple valid options when determining the referents of “she” and “it.” The conversation’s general focus on Anna’s birthday likely enables a convergence of understanding on “Anna” as the “she”; Anna is highly salient in the immediate context. Listeners will need to rely on subtler mutual salience to determine whether “it” refers to the party, some particular present, or something else entirely.

In the present study, we do not directly probe how interlocutors use focal points in conversation. Instead, we informally replicate Schelling’s first survey. We consider both the results of our survey and of Schelling’s survey to theorize how these generalized points of mutual salience may add to our understanding of the implicit coordination facilitating everyday conversation.

Methods

We constructed a survey modeled after Schelling's original report. Schelling himself did not perform a true "study" in reporting his results, but rather loosely surveyed the **graduate?** students in his class at **Yale?** in **the year**. Our data collection was similarly gathered quite loosely. The survey data were collected with the intention of serving a pedagogical purpose and with no intention to be published as rigorous study. While we cannot use these data to make empirical claims, they are nonetheless a useful and thought-provoking educational tool (as Schelling's data certainly were).

Survey design

Schelling's classroom survey asked students questions challenging them to ambiguously "win" a game by coordinating with a stranger. Famously, he asked where and when the participants would meet a stranger in New York City without any prior communication. Additionally, the survey included a series of questions encouraging convergence on a response in more "game-like" circumstances: guessing a number, flipping a coin, etc.

The survey in this report was in essence an abbreviated version of Schelling's. It included a selection of the "game-like" questions taken directly from Schelling's survey. We asked the classic where-and-when questions with some revisions. Because our survey was conducted at the University of Chicago, our version of the where-and-when question asked about meeting a stranger in Chicago rather than New York City. We additionally included two follow-up questions that were not included in Schelling's data, changing the interpersonal context between the participant and hypothetical partner.

Participants

The survey was distributed to 242 individuals currently affiliated with the University of Chicago, primarily students enrolled in the courses using the survey as a pedagogical resource (e.g., the undergraduate core social sciences sequence *Mind*).

Data analysis

Responses have been cleaned to account for predictable variations in how individuals input popular responses – e.g., “the reg”, “Regenstein”, and “In the Reg.” are all reported as “The Reg.” Ambiguous responses (e.g., “the library”) are left ambiguous.

Exclusions. A total of NUMBER GOES HERE responses to the “meetup location” questions were excluded (out of NUMBER GOES HERE total) or re-coded as “Other”.

Responses that indicate clear misunderstanding of the question are excluded. These primarily consisted of responses in the “meeting a stranger” or “meeting a student” questions. Since these questions specify that the other party is unknown to the respondent, responses should not assume prior familiarity or experience with the other party, for example “their house”, “the last place we last met”, “where we usually see each other”, or “where you expect them to be at a certain time.”

Responses to the meetup location questions were coded as “Other” if they included multiple locations without rankings (e.g., “pret or hutch”), were overly vague (e.g., “a major center within the city that everyone knows about”), or fanciful/impossible (e.g., “THE MOON!”).

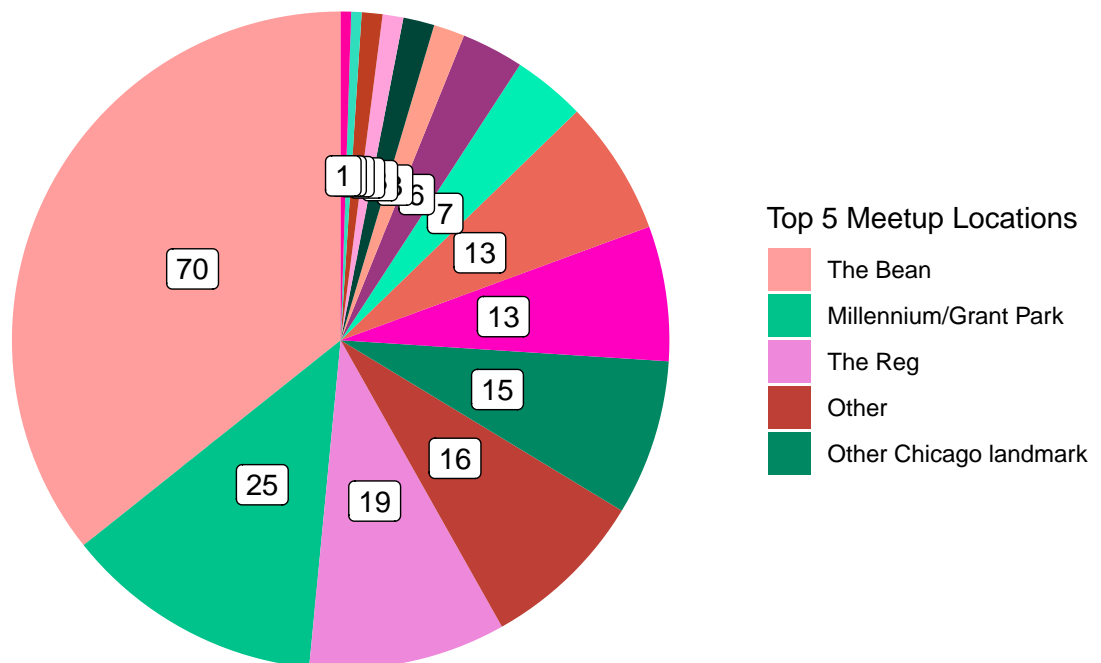
Results

Managing to meet

Meeting a stranger. You are meeting a stranger in Chicago. You both know that you need to meet each other today, but you haven't agreed on a place or a time and you have no means of communication. *Remember, you cannot communicate with them now or previously in any way!*

WHERE do you go to meet them?

196 total responses



Response breakdown:

Response	N	Percent
The Bean	70	35.71
Millennium/Grant Park	25	12.76
The Reg	19	9.69
Other	16	8.16
Other Chicago landmark	15	7.65
Other cafe/dining	13	6.63
The Quad	13	6.63
Dorms	7	3.57
Sears/Willis Tower	6	3.06
Other residence	3	1.53
Other UChicago	3	1.53
Ex Libris	2	1.02
Other library	2	1.02
Pret a Manger	1	0.51
Reynold's Club	1	0.51

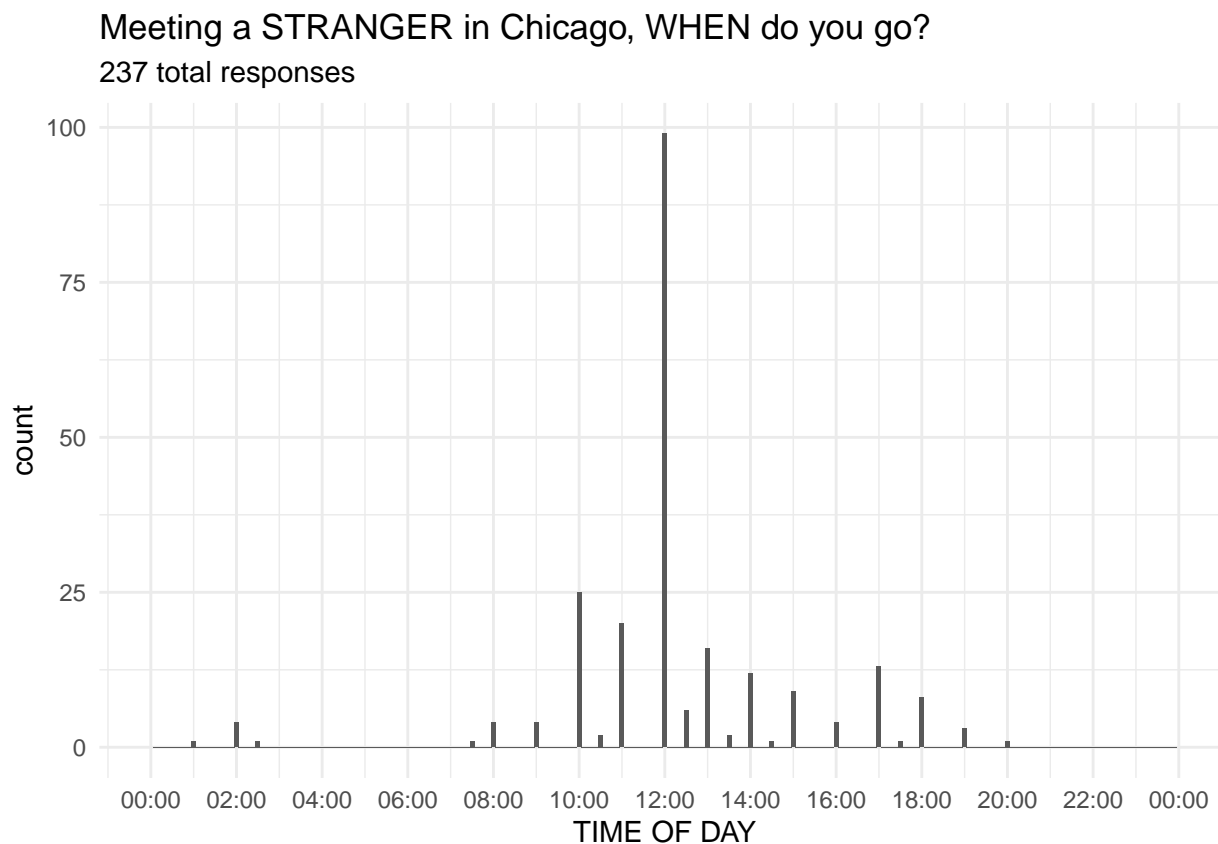
The most common response for where to meet a *stranger* in Chicago was The Bean, with 70 responses (35.71%).

Common responses of Chicago landmarks included the Bean/Cloudgate ($N = 70$), Millennium/Grant Park ($N = 25$), and the Sears/Willis Tower ($N = 6$).

All responses grouped into “Other” categories (Other, Other Chicago landmark, Other cafe/dining, Other residence, Other UChicago, Other library):

Other responses
A Starbucks
Art Insitute
Art institute
Art Institute
art institute entrance
Bartlett Dining Commons
Buckingham Fountain
Chicago
Clark and Lake
Cloud gate
coffee shop
community center
Downtown Art institute of Chicago
Downtown near the loop
Downtown near the tallest building in Chicago.
Harper
Hutchinson Commons
I don't go meet them.
I would go to Depaul University's Barnes and Nobles
I would go to the nearest coffee spot to my home
In a coffee shop or a quiet (brunch) restaurant.
It is literally impossible
Library
Magnificent Mile
Meet them at your apartment.
My apartment
My home
Navy Pier

WHAT TIME do you go to meet them?



Time breakdown... 41.35% (98 out of 237) of people chose to meet at **exactly 12:00**.

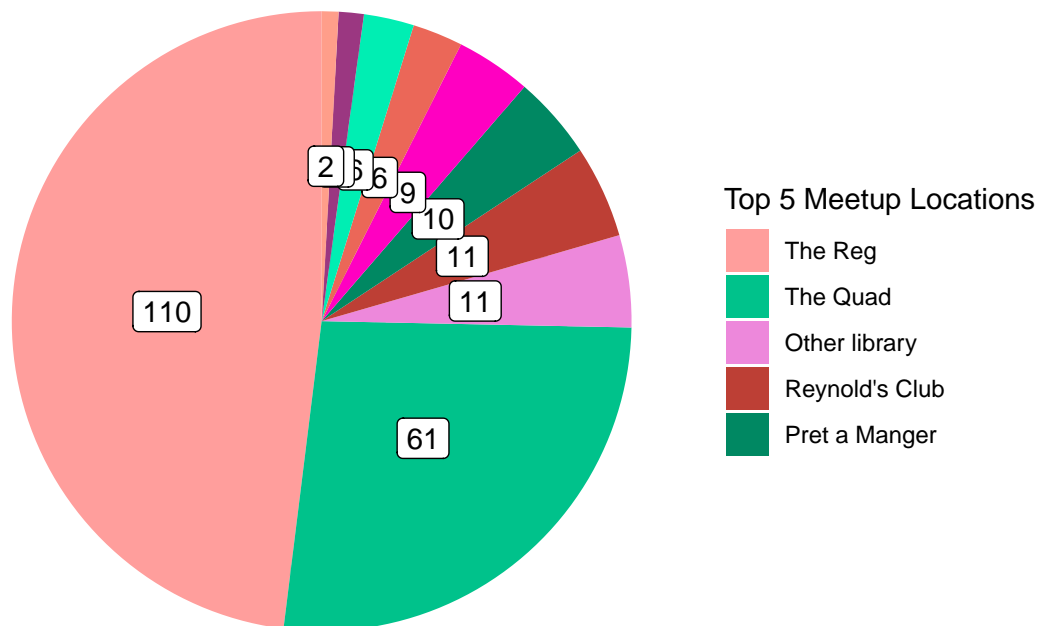
52.32% chose another time “on the hour” (but not 12:00).

5.91% chose a time “on the half hour.”

Just 0.42% (1 lonely person) chose anything else.

Meeting an unfamiliar student. You are meeting another UChicago student who you have not met before. You both know that you are both UChicago students and that you should meet today, but you haven’t agreed on a meeting location and you have no means of communication. **Where** do you go to meet them?

WHERE do you meet an UNFAMILIAR UCHICAGO STUDENT in Chicago?
229 total responses



Response breakdown:

Response	N	Percent
The Reg	110	48.03
The Quad	61	26.64
Other library	11	4.80
Reynold's Club	11	4.80
Pret a Manger	10	4.37
Other cafe/dining	9	3.93
Other	6	2.62
Other UChicago	6	2.62
Ex Libris	3	1.31
Dorms	2	0.87

The most common response for where to meet an *unknown UChicago student* in Chicago was The Reg, with 110 responses (48.03%). By comparison, only 19 respondents (9.69%) chose to meet a stranger at The Reg.

While The Bean was the most common response for where to meet a *stranger* in Chicago, no respondents chose to meet an unfamiliar UChicago student at The Bean.

All responses grouped into “Other” or general categories (Other library, Other cafe/dining, Other, Other UChicago, Dorms):

Other responses

1155 building

At the library.

Bartlett

Bartlett or the Reg

Bartlett; I assume they have to stop by at some point.

Big arch

bookstore

Bookstore

cafeteria

Campus North

Harper Library

Hutchinson

I just don't meet them then

I would go to a dining hall most likely

In the library, or student lounges.

library

Library

Mansueto/reg entrance

no idea

Outside the Bookstore

Plein Air

starbucks

the book store

the dining hall

The library

The library's

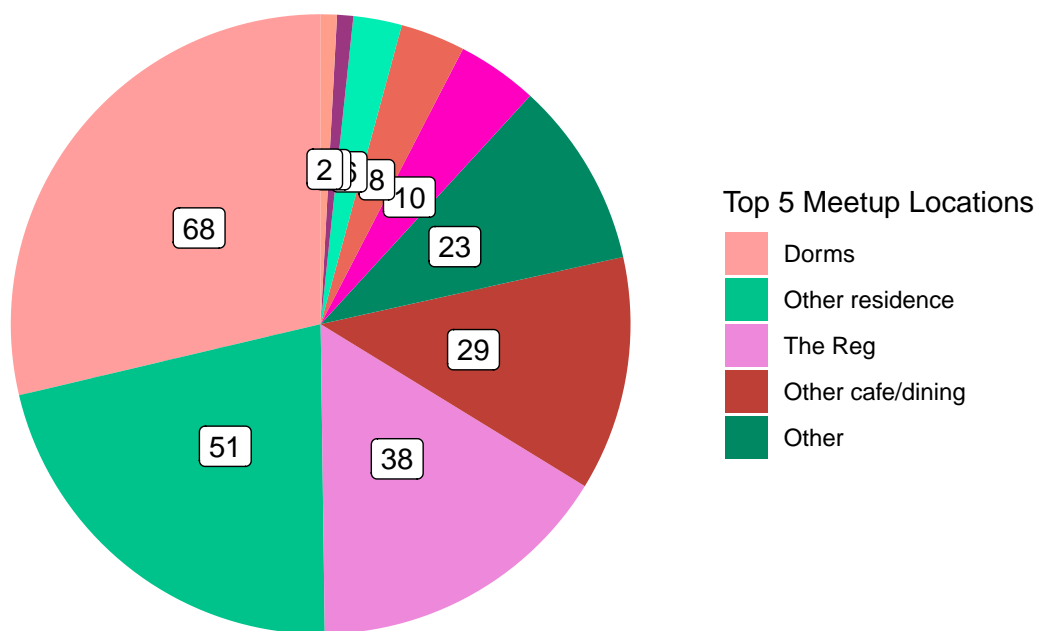
The square

This is tough but I would also say somewhere in the dorm!

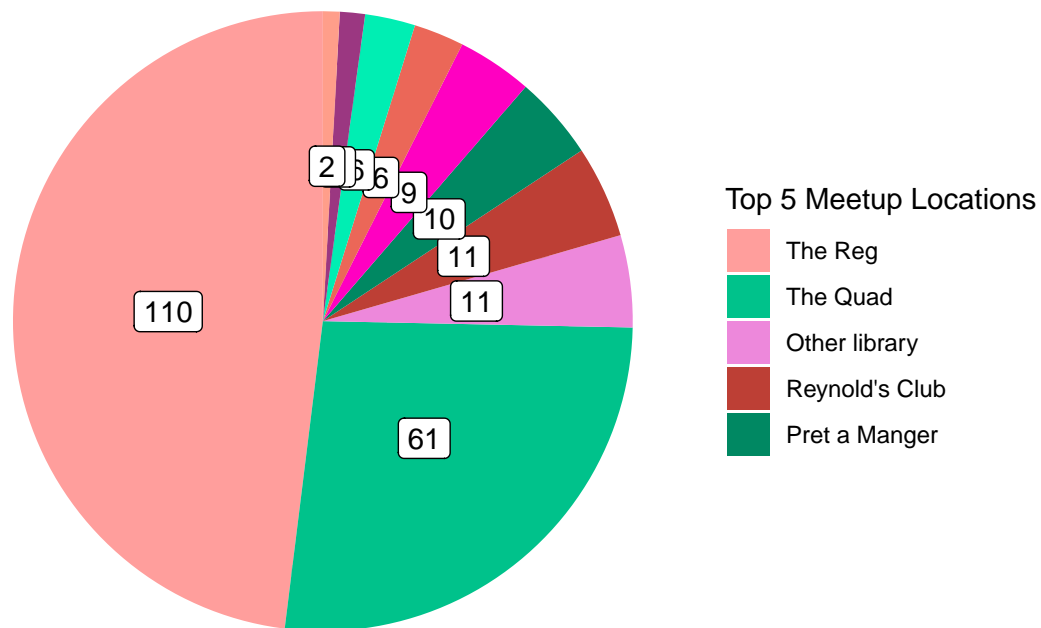
UChicago halls

Meeting your UChicago friend. You are meeting your closest friend at UChicago. You haven't agreed on a meeting location and you have no means of communication. **Where** do you go to meet them?

WHERE do you meet your CLOSEST UCHICAGO FRIEND in Chicago?
237 total responses



WHERE do you meet an UNFAMILIAR UCHICAGO STUDENT in Chicago?
229 total responses



Response breakdown:

Response	N	Percent
Dorms	68	28.69
Other residence	51	21.52
The Reg	38	16.03
Other cafe/dining	29	12.24
Other	23	9.70
Other UChicago	10	4.22
Pret a Manger	8	3.38
Other library	6	2.53
Recent meeting location	2	0.84
The Quad	2	0.84

The most common response for where to meet a close UChicago friend in Chicago was Dorms, with 68 responses (28.69%). By comparison, only 7 respondents (3.57%) chose to meet a stranger at Dorms and only 2 respondents (0.87%) chose to meet a stranger at Dorms.

While The Bean was the most common response for where to meet a *stranger* in Chicago, no respondents chose to meet a close UChicago friend at The Bean.

The Reg was the most common response for where to meet an *unfamiliar UChicago student* in Chicago, but only 38 respondents (16.03%) chose to meet a close UChicago friend at The Reg.

All responses grouped into “Other” or general categories (Other residence, Other cafe/dining, Other, Other UChicago, Other library, Dorms, Recent meeting location):

Other responses

1155

1155 building

a coffee shop we regularly visit together

at apartment

At the CI and I (thats where we always end up)

At the dining hall.

At their apartment

At their dorm

at their room

at Woodlawn dormitory

Baker

Baker dining hall

Bartlett

Bartlett or max p

Beecher

Burton Judson Courts

cafe

Campus North

Cathey

Cathey lounge

classroom building

common spot

Crerar

Dining hall

Dollop

Dollop coffee

Dorm

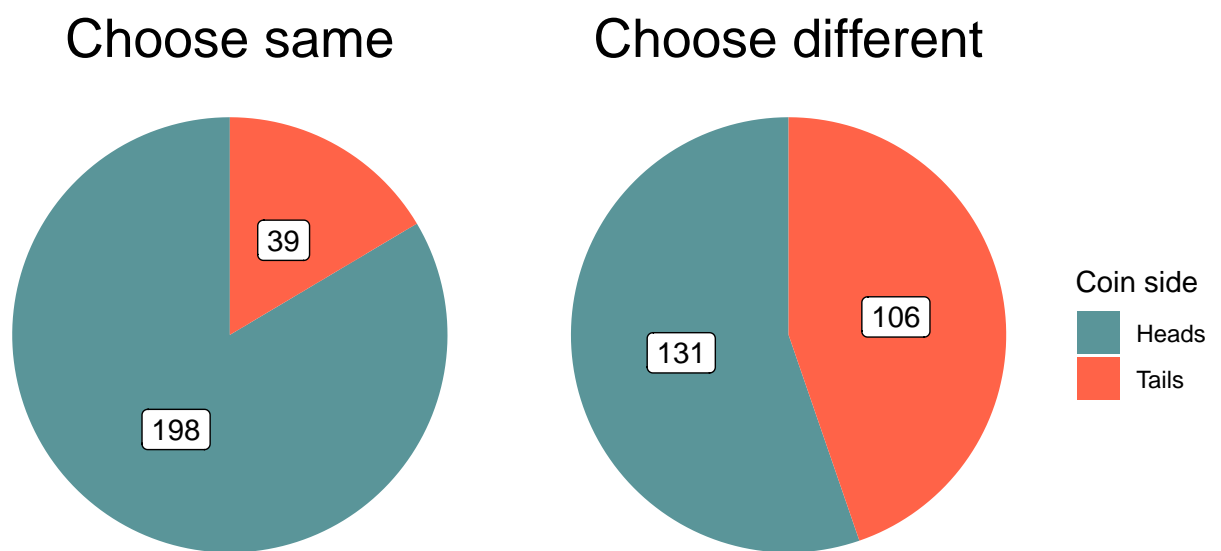
Dorm Room

Dorm

Coins

You and an anonymous partner need to choose heads or tails. If you both choose the **SAME** answer, you both win. Which do you choose?

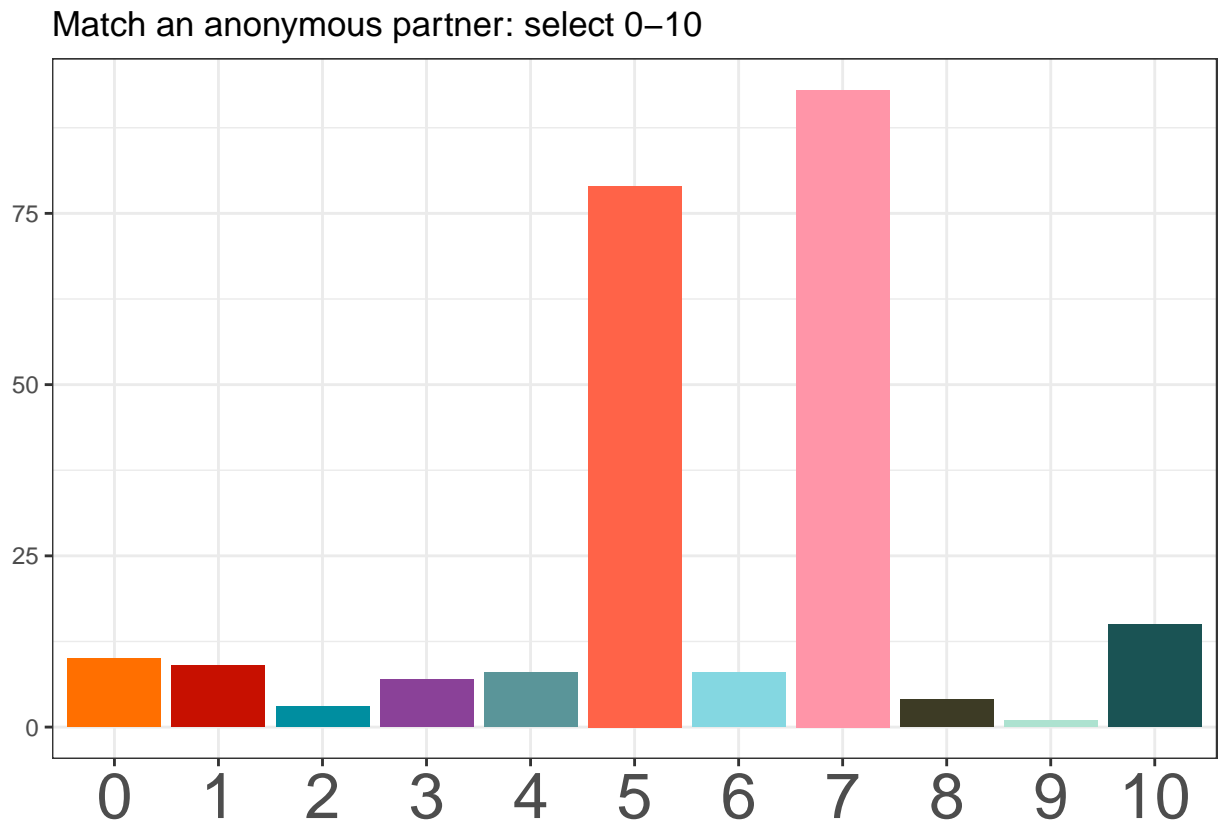
...If you both choose a **DIFFERENT** answer, you both win. Which do you choose?



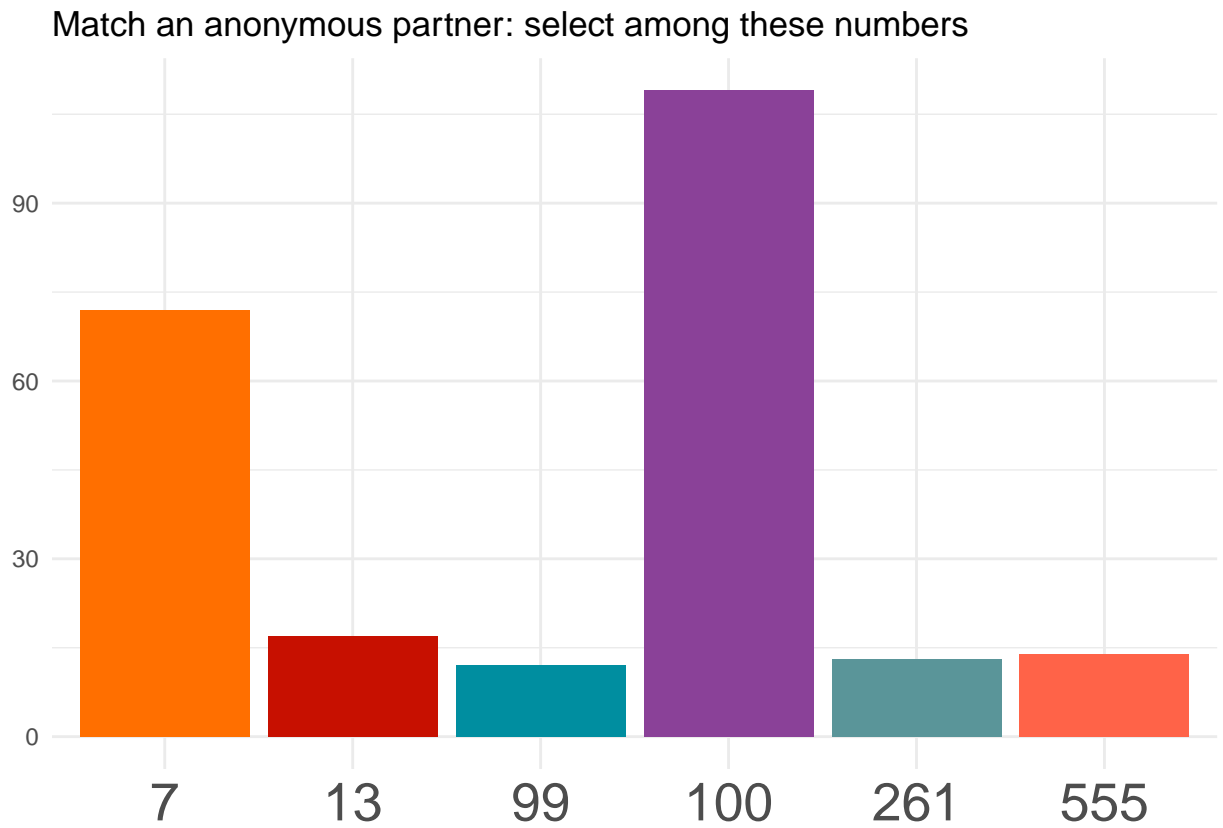
	Heads	Tails	Sum
Choose same	83.54	16.46	100
Choose different	55.27	44.73	100

Numbers...

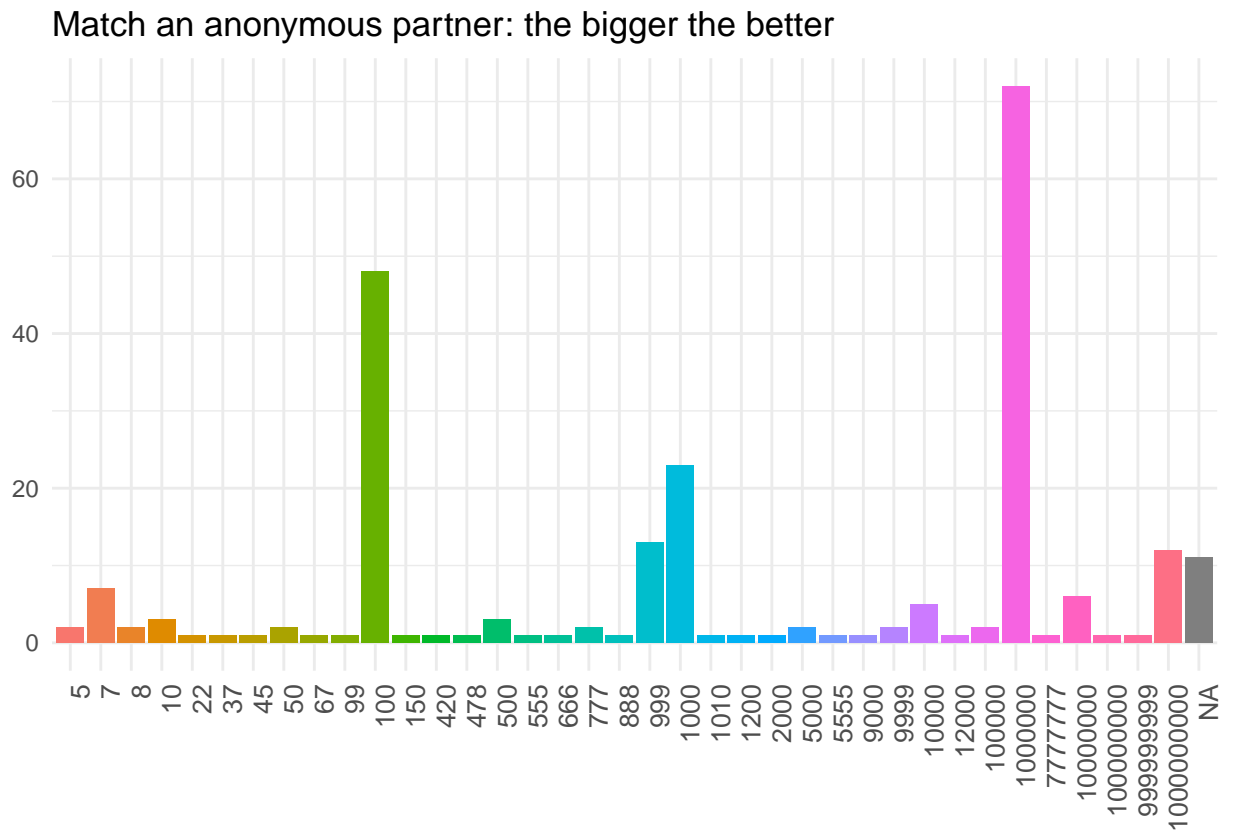
Pick a number 0 to 10. You win if you match your partner.



Select a number from the set. You win if you match your partner.



Pick any number. You win if you match your partner, *and* the bigger the number, the more you both win.



Discussion

References

- Brown, P., & Levinson, S. C. (1993). *Linguistic and non-linguistic coding of spatial arrays: Exploration in Mayan cognition*.
- Clément Canonne. (2013). Focal Points in Collective Free Improvisation. *Perspectives of New Music*, 51(1), 40.
- Rondinelli, D. A. (1973). Urban Planning as Policy Analysis: Management of Urban Change. *Journal of the American Institute of Planners*, 39(1), 13–22.
- Ross, T. L., & Collister, L. B. (2014). A social scientific framework for social systems in online video games: Building a better looking for raid loot system in World of Warcraft. *Computers in Human Behavior*, 36, 1–12.
- Schelling, T. C. (1960). *The Strategy of Conflict*. Harvard University Press. Retrieved from <https://books.google.com?id=7RkL4Z8Yg5AC>
- Wong, S.-K., Volonte, M., Liu, K.-Y., Ebrahimi, E., & Babu, S. V. (2023). Comparing Visual Attention with Leading and Following Virtual Agents in a Collaborative Perception-Action Task in VR. *2023 IEEE Conference Virtual Reality and 3D User Interfaces (VR)*, 152–162.
- Yoon, K., & Hollingshead, A. B. (2010). Cultural Stereotyping, Convergent Expectations, and Performance in Cross-Cultural Collaborations. *Social Psychological and Personality Science*, 1(2), 160–167.