

# THE QUESTION OF QUESTIONS: RESOLVING (NON-)EXHAUSTIVITY IN *WH*-QUESTIONS

BY MORGAN C. MOYER

A dissertation submitted to the  
Graduate School—New Brunswick  
Rutgers, The State University of New Jersey  
in partial fulfillment of the requirements

for the degree of  
Doctor of Philosophy  
Graduate Program in Linguistics

Written under the direction of

Kristen Syrett, PhD

and approved by

---

---

---

---

New Brunswick, New Jersey

October, 2020

## Appendix A

### Stimuli for Experiment 1

- (184) Within-subjects Factors:
- a. Context: Mention-All-True (MAT), False Report (FR), Mention-Some-True (MST), Weak-Exhaustive+False Report (WE+FR)
  - b. Verb: *know*, *predict*
  - c. WH: *who*, *where*
  - d. Embedded verbs
    - i. *Who*: *find*, *view*, *store*, *locate*, *hide*, *bury*, *sell*, *display*
    - ii. *Where*: *recruit*, *interview*, *invite*, *ask*, *call*, *hire*, *select*, *contact*
- (185) Between subjects: Tense (finite vs. non-finite)

#### A.1 Non-Finite Condition

##### A.1.1 Weak Exhaustive True Context

###### **Predict-where-store**

Since it is almost Christmas time, the Santa's Workshop is a mess. He needs to become more organized in order to get all the presents to the children in time. He is calling in all his elves into the workshop to help clean up. They have a surplus of wrapping paper that must be put away. He and Mrs. Claus are guessing where to store the paper.

Mrs. Claus says, "Under the bed and in the closet."

When they finally get around to storing the paper, there is space under the bed and in the closet, but the cupboard is too full to fit any paper.

Santa reports, "Mrs. Claus predicted where to store the wrapping paper."

Is Santa right?

###### **Predict-where-sell**

Danny is trying to sell his collection of ugly Christmas sweaters. He has permits to sell at the mall, at the local boutique, at a pop-up in town, and online. He asks his friend Felicia to guess which places will be successful.

Felicia says, "The local boutique and the pop-up in town."

As it turns out, the online store and mall location did poorly, but the local boutique and the pop-up did very well.

Danny reports, "Felicia predicted where to sell the sweaters."

Is Danny right?

---

### **Predict-who-invite**

The Paris Hotel only accommodates seven people in a hotel room. The Vellucis have decided to go on vacation and stay in a fancy hotel. Mom and Dad allowed Amanda to invite four friends to come on vacation with them: Jenny, Buster, Janice, and Sally. Mom and Dad are guessing which friends will actually be good guests at the hotel.

Mom guesses, "Jenny, Buster, and Janice."

Turns out, Sally was quite the raucous guest, and created havoc wherever she went. The other three were very well-behaved.

Dad reports, "Mom predicted who to invite on vacation."

Is Dad right?

---

### **Predict-who-select**

Christina and Gabe are deciding who they're going to select for office party planning committee this year. They ask Bill, Jimmy, Cate, Veronica and Ezra to be on the committee. Now they are wondering which of these people will be good party planners. Gabe asks Christina to guess who she thinks will be good to select.

Christina says, "Cate, Veronica and Ezra."

As it turns out, Cate, Veronica and Ezra do a really great job making the party memorable. On the other hand, Bill and Jimmy slack off and don't do any work.

Gabe reports, "Christina predicted who to select to be on the committee."

Is Gabe right?

---

### **Know-where-view**

Zack is going on vacation to California and wants to see the Hollywood Sign. He hopes to find the best place possible to view the sign. He asks his brother Joe, who lives in LA, where to find the best view. Actually, Beachwood Canyon, Lake Hollywood Park, The Griffith Observatory, and Mulholland Drive all have great views of the Hollywood Sign, but Downtown and Runyon Canyon Park have horrible, smoggy

views.

Joe responds, "Beachwood Canyon, Lake Hollywood Park, The Griffith Observatory, and Mulholland Drive."

Zack reports, "Joe knows where to view the Hollywood Sign."

Is Zack right?

---

### **Know-where-bury**

FBI Special Agents Mulder and Scully are looking for evidence that the government is trying to cover-up the existence of aliens. They have collected several key pieces proving the existence of a government cover-up. Now they must bury the evidence so that government agents cannot find and destroy it. They are considering the woods behind Mulder's apartment, Scully's garden, the bushes outside the FBI offices, and Rock Creek Park. Mulder asks Scully where to bury the evidence. Really, the government agents will search the woods behind Mulder's apartment and Scully's garden, but not Rock Creek Park or the bushes outside the FBI office.

Scully says, "In Rock Creek Park, and in the bushes outside the FBI office."

Mulder reports, "Scully knows where to bury the evidence."

Is Mulder right?

---

### **Know-who-interview**

Carolina just started working at a newspaper. She's researching a story on nuclear waste, and has to figure out who to interview. She is considering Dawn, Jeff, Valentine, and Ellen. Actually, Jeff, Valentine, and Ellen all are truthful and helpful people, but Dawn is a notorious liar. Carolina asks her mentor Veronica who to interview.

Veronica says, "Jeff, Valentine, and Ellen."

Carolina reports, "Veronica knows who to interview for the story."

Is Carolina right?

---

### **Know-who-hire**

Martha and Eileen are painting a mural in the cafe they own together. They've hired their friends Jules, Butch, Jeff, and Kat to help them out. They are deciding who, among their friends, will do good jobs. Actually, Butch, Jeff and Kat are great painters, but Jules is very sloppy.

Martha says, "Butch, Jeff and Kat."

Eileen reports, "Martha knows who to hire for painting the mural."

Is Eileen right?



### A.1.2 False Report Context

#### Predict-where-locate

At the popular EDC concert, Ultra, there was an all-time high of attendees this year: almost 20,000 people. There aren't a ton of places to easily get a good view of the stage. Jim and Mary have general admission tickets. He asks her to guess a good dance spot.

Mary says, "The orchestra pit and right at the front of the stage."

As it turns out, the best spots were on either side of the stage, or farther away on the hill in back. The orchestra pit and right at the front of the stage are bad because there are too many people.

Jim reports, "Mary predicted where to locate a good spot."

Is Jim right?

---

#### Predict-where-display

The preschoolers always make cards for their parents on Valentine's Day, and their parents are expected to hang these cards up somewhere in their houses. Michelle gave a card to her parents and is wondering where to hang it: the refrigerator, the living room, the bathroom, the bedroom or the kitchen. Michelle asks her sister Maddie to guess where to display her card.

Maddie says, "The surface of the refrigerator and the living room walls."

Actually, the surface of the refrigerator is very slippery, the living room walls are too crowded, and the bathroom is too damp. However, the bedroom and kitchen walls are quite good for hanging things.

Michelle reports, "Maddie predicted where to display the card."

Is Michelle right?

---

#### Predict-who-ask

There are six sales associates working at Nordstrom's on Black Friday. A notoriously difficult but regular customer has come into the store today. The manager and assistant manager, who usually help this customer, are very busy. There are several new employees, so the manager asks her assistant to guess which sales associates to send.

The assistant manager says, "Sue and Parker."

As it turns out, Dana, Crystal and Morgan are all incredibly professional sales associates, but Sue, Parker, and Taylor are inattentive and uninterested in helping customers.

The manager reports, "The assistant manager predicted who to ask to take care of the customer."

Is the manager right?

---

### **Predict-who-contact**

There is a family emergency at home and parents need to get a hold of their kids Melissa and Dan. Fortunately, the kids are all at the movies together, with their friend Mitch's parents, Chris and Jim. Mom and Dad don't know who would most likely be on their phone during the movie. Mom asks Dad to guess who they should call.

Dad says, "Melissa and Mitch."

As it turns out, Dan, Chris and Jim were all on their phones, but Melissa and Mitch had turned their phones off.

Mom reports, "Dad predicted who to contact during the movie."

Is Mom right?

---

### **Know-where-store**

The holidays are the malls' biggest season. The shoe sale in particular was the craziest, as boots were marked at least 50% off their original price. Jim and Martha went shopping and bought too many boots. Unfortunately, they live in a small apartment with little storage space. Actually, the only places where there is space is under the bed, under the couch, and in the kitchen cupboard. The bedroom and hall closets are totally full. Jim asks Martha where they're going to store all their shoes.

Martha says, "The bedroom closet and the hall closet."

Jim reports, "Martha knows where to store the boots."

Is Jim right?

---

### **Know-where-sell**

Julia has just created a new perfume, and has permits to sell it at the Perfumerie, Macy's, Lord and Taylor, at a pop-up in town, and at the local boutique. Actually, the best selling locations are the local boutique, the pop-up and Perfumerie. Macy's and Lord and Taylor sell only two bottles. Her friend Paula asks her where to sell the perfume.

Julia says, "Macy's."

Paula reports, "Julia knows where to sell the perfume."

Is Paula right?

---

**Know-who-invite**

Marissa has been having some problems with her husband's side of the family, but Thanksgiving is tomorrow and she has already agreed to host the dinner. She's thinking of inviting a couple of friends as a buffer. She asks her husband which of their friends would be good to have at the dinner. Really, Maggy, Jim and Rick are all great friends for socializing with strangers, but Ari, Gillian, and Tim are shy in large groups.

Her husband says, "Ari, Gillian and Tim."

Marissa reports, "My husband knows who to invite for Thanksgiving dinner."

Is Marissa right?

---

**Know-who-select**

Frannie is the CEO for a prestigious finance firm. She and her coworker Donna are wondering which brokers should be selected for promotion—Gina, Mark, Samantha, Bob and Pat. Frannie asks Donna who will be selected for a promotion. In fact, Gina, Samantha and Pat sell a lot of stocks, while Mark and Bob do not.

Donna says, "Mark and Bob."

Frannie reports, "Donna knows who to select for the promotion."

Is Frannie right?

**A.1.3 Mention-Some True Context****Predict-where-view**

Mary has a special bucket list item she wishes to check off her list, and first on the list is to view the Northern Lights. She is willing to travel wherever she will be able to have a great view of the lights. Her friend, Abby, is helping Mary guess which places are good to see the Northern Lights.

Abby responds, "Alaska."

In fact, Alaska, Denmark, Scotland, and Greenland are great places to find the best view of the northern lights, while New York, Texas and Arizona have too low latitude to see the lights.

Mary reports, "Abby predicted where to view the Northern Lights."

Is Mary right?

---

**Predict-where-bury**

Dima and Masha are running from political turmoil in their home country. They first have to bury their most valuable possessions, to keep them safe from the government.

They could bury them in the backyard of their house, in the stables down the street or in the local cemetery. Masha asks Dima to guess where to bury the possessions.

Dima says, "In the stables down the street."

To play it safe, Masha buries their possessions in all three locations. The government however, finds the possessions buried in the backyard.

Masha reports, "Dima predicted where to bury our possessions."

Is Masha right?

---

### **Predict-who-interview**

The psychologist at a local primary school is looking to hire an intern. The application process is competitive, so there is a need to conduct interviews. This year they have five candidates: John, Gwen, Greg, Sam, and Megan. The psychologist and her supervisor guess who they should interview.

The supervisor says, "Megan."

The psychologist contacted Megan, John, Gwen, and Sam to set up interviews. All were offered internships, but after a month or so into the internship, Gwen and Sam quit unexpectedly and without notice.

The psychologist reports, "The supervisor predicted who to interview for the internship."

Is the psychologist right?

---

### **Predict-who-hire**

Julia and Peter are running a summer camp, and they need to hire counselors. They are considering hiring Vera, Kristen, Jess, Morgan and Stephen. Julia asks Peter to guess who to hire.

Peter says, "Morgan."

They end up hiring all five candidates, but Stephen ends up getting kicked out because he's a trouble maker.

Julia reports, "Peter predicted who to hire as a camp counselor."

Is Julia right?

---

### **Know-where-find**

Billy and his neighbors are playing hide and seek in the park. It is his turn to close his

eyes and count to ten. Actually, his friends are hidden under the slide, in the tunnel, behind the swings, but not in the tree. After he is finished counting, he sees his classmate Jimmy, and asks Jimmy to help him find his friends.

Jimmy says, "Under the slide."

Billy reports, "Jimmy knows where to find the people hiding."

Is Billy right?

---

### **Know-where-hide**

Chris is always taking Alice's money so she wants to hide it from him. There are several possible places: in the mattress, in the couch, and in a shoebox in the closet. Actually, Chris's favorite hiding place is in the shoebox in the closet, so he will only look there. Alice asks Geoff where to hide her money.

Geoff says, "In the mattress."

Alice reports, "Geoff knows where to hide the money."

Is Alice right?

---

### **Know-who-recruit**

Brielle is a recruiter for the soccer team and is attempting to gather new players for the upcoming soccer season. She would like to recruit the best players, as this upcoming season is an important one.

Annie, Sue, Maggy, Dany, Abby and Jen are all trying out. Annie, Sue and Maggy were kicked off their old teams for insubordination, but Dany, Abby and Jen are all in Olympic Development Programs for soccer. The coach asks Brielle her opinion.

Brielle says, "Dany."

Coach reports, "Brielle knows who to recruit for the team."

Is Coach right?

---

### **Know-who-call**

Chris is a new telemarketer trying to sell life insurance. The call list includes people over 60, people under 30, and people between 30 and 60. Actually, not only do people under 30 actively screen their calls and therefore do not pick up the phone, but those who do are not interested in life insurance. The other demographics are good to target. Since Chris is trying to increase his success, he asks his coworker Cindy who to call.

Cindy says, "People between 30 and 60."

Chris reports, "Cindy knows who to call for life insurance."

Is Chris right?

### A.1.4 Weak Exhaustive+False Report Context

#### **Predict-where-find**

Sparky the dog buried his toys in the backyard last week. He hid them so well that now he cannot seem to find any. A neighbor, Jill, comes over to help Mary, Sparky's owner, find the toys in the yard. Jill asks Mary to guess where they are hidden.

Mary says, "In the middle of the yard, behind the shed, next to the large tree, under the swing set, and under the deck."

After hours of searching, they find the toys behind the shed, next to the large tree, under the swing set, and under the deck. No toys were in the middle of the yard, on the side of the house, or near the mailbox.

Jill reports, "Mary predicted where to find the toys."

Is Jill right?

---

#### **Predict-who-recruit**

Jenna is in a sorority and is in charge of recruitment this year. She hopes to recruit girls who have a lot to contribute to the organization. This year, they have four pledges: Mary, Susan, Britney, and Shiela. Jenna and her friend Sam are guessing who will be the best sisters.

Sam says, "Mary, Susan, Britney and Shiela."

Jenna ends up recruiting all four girls, but it turns out Susan, Britney and Shiela become really great members of the sorority, but Mary becomes a huge trouble-maker and gives the sorority a bad reputation.

Jenna reports, "Sam predicted who to recruit for the sorority."

Is Jenna right?

---

#### **Predict-where-hide**

Davey eats too much chocolate. He went to Costco the other day and bought a bulk package of Ferrer Roche. He asks his friend Mackenzie to hide the chocolate for him. Mackenzie asks her friend Ruth to guess where to hide the chocolate.

Ruth says, "In the freezer, in the dresser drawers, in the linen closet, and inside Davey's suitcase."

Mackenzie hides the chocolate in the dresser drawers, in the linen closet and inside Davey's suitcase, but also in the freezer and in Davey's desk. Davey finds the chocolate in the freezer and in the desk, but not in the other places.

Mackenzie reports, "Ruth predicted where to hide the chocolate."

Is Mackenzie right?

---

### **Predict-who-call**

Ralph and Ortcutt are gardeners. Their garden is festively decorated with garden gnomes, for which they have a particular predilection. One day, they notice that their gnomes have been vandalized. They are considering who to call: The Society for Garden Well-Being (SGWB), The National Gnome Association (NGA), Gnomes Anonymous (GA), the Police, and the American Society for the Prevention of Cruelty to Gnomes (ASPCG). Ralph asks Ortcutt to guess who to call.

Ortcutt says, "The SGWB, the Police, the ASPCG, and GA."

Ralph calls all five places, but as it turns out, the only organizations that deal with garden varieties of vandalism are the Police, the ASPCG, and GA. The other two organizations express their condolences and abhorrence of vandalism, but offer no further support.

Ortcutt reports, "Ralph predicted who to call about the vandalism."

Is Ortcutt right?

---

### **Know-where-locate**

For a summer trip, two friends Meg and Xavier are traveling to Petra in Jordan. Petra, an ancient city, has walls surrounding the city, so you can only enter at certain places. In fact, the entrances are at the Southeast, East and Northwest points, but there are no entrances at the other points. Xavier asks Meg to guess where to locate the entrances.

Meg says, "West, Southeast, East, and Northwest."

Xavier reports, "Meg knows where to locate the entrances."

Is Xavier right?

---

### **Know-where-display**

The Center Hall of Art is a very prestigious hall where only the most high quality art is ever displayed. Dan is excited because he has worked very hard on his paintings and is extremely excited to be told that they have been chosen to be displayed in the Center Hall of Art.

The front foyer, the velvet curtain room and the blue room have the highest traffic, while the downstairs lobby and the back room have much less traffic. Dan asks his dad where he thinks the paintings will be most viewed.

Dan's dad says, "Downstairs lobby, in the front foyer, the room with the velvet curtains, and the room with the blue lights."

Dan reports, "Dad knows where to display my paintings."

Is Dan right?

---

#### **Know-who-ask**

Tim needs some advice about what he should do after high school because he's not sure about going to college just yet. He has several friends who like to give advice: Jim, Kate, Fran, Jess, and Connie. Jim, Kate and Fran give good advice, while Jess and Connie give bad advice. He isn't sure so he consults his friend Jen.

Jen says, "Connie, Jim, Kate, and Fran."

Tim reports, "Jen knows who to ask for advice."

Is Tim right?

---

#### **Know-who-contact**

Jafari and Marjane are planning a surprise party for their mother. They want to ask several of her friends to help out. They are considering: Susan, Anita, Simone, and Hazel. The problem is that one of their mother's friends is a huge loud mouth and will probably let the secret slip. In fact, Susan is the loud mouth, but the other ladies can keep a secret. Jafari asks Marjane who to contact for the party.

Marjane responds, "Susan, Anita, Simone, and Hazel."

Jafari reports, "Marjane knows who to contact about the party."

Is Jafari right?

## **A.2 Finite Condition**

### **A.2.1 Weak Exhaustive True Context**

#### **Predict-where-store**

It is almost Christmas time and the Santa's workshop is a mess. He needs to become more organized in order to get all the presents to the children in time. He is calling in all his elves into the workshop to help clean up. They have a surplus of wrapping paper that must be put away. The reindeer are discussing the situation.

Rudolf asks Prancer, "Where do you think they will store the paper?"

Prancer says, "I think under the bed and in the closet."

When they finally get around to storing the paper, there is space under the bed and in the closet, but the cupboard is too full to fit any paper.



Rudolph reports, "Prancer predicted where they stored the wrapping paper."

Is Rudolph right?

---

### **Predict-where-sell**

Dante and Bea are trying to sell a collection of ugly Christmas sweaters. They are trying to get permits to sell at the mall, at the local boutique, at a pop-up in town, and online. Their friends, Felicia and Gabe are discussing whether they will be successful.

Gabe asks Felicia, "Where do you think they will sell the sweaters?"

Felicia says, "I think the local boutique, the pop-up and online."

As it turns out, they are unable to get a permit to sell at the mall, but are able to get permits to sell at the other places.

Gabe reports, "Felicia predicted where they sold the sweaters."

Is Gabe right?

---

### **Predict-who-invite**

The Paris Hotel only accommodates seven people in a hotel room. The Vellucis have decided to go on vacation and stay in a fancy hotel. Mom and Dad allowed Amanda and Billy to invite three friends to come on vacation with them.

Mom asks dad, "Who do you think they will invite?"

Dad says, "I think Jenny, Buster and Janice."

Actually, they end up inviting Jenny, Buster and Janice, but not Sally.

Mom reports, "Dad predicted who they invited on vacation."

Is Mom right?

---

### **Predict-who-select**

Christina and Gabe are deciding who they're going to select for office party planning committee this year. They ask Bill, Jimmy, Cate, Veronica and Ezra to be on the committee. Now they are wondering which of these people will be good party planners.

Veronica asks Cate, "Who do you think they will select?"

Cate says, "I think Cate, Veronica and Ezra."

As it turns out, Cate, Veronica and Ezra are all selected, but Billy and Jimmy are not.

Veronica reports, "Cate predicted who they selected to be on the committee."

Is Veronica right?

---

### **Know-where-view**

Zack and Joe are going on vacation to California and want to see the Hollywood sign.

Zack's mom asks his dad, "Where do you think they will view the sign?"

His dad responds, "I think Beachwood Canyon, Lake Hollywood Park, and the Griffith Observatory."

Actually, they go to Beachwood Canyon, Lake Hollywood Park, and the Griffith Observatory, but not Downtown or Runyon Canyon Park.

Mom reports, "Dad knows where they viewed the Hollywood Sign."

Is Mom right?

---

### **Know-where-bury**

FBI Special Agents Mulder and Scully are looking for evidence that the government is trying to cover-up the existence of aliens. They have collected several key pieces proving the existence of a government cover-up. Now they must bury the evidence so that government agents cannot find and destroy it.

Assistant Director Skinner's assistant asks him, "Where do you think they will bury the evidence?"

Skinner says, "I think in Rock Creek Park and in the bushes outside the FBI office."

Actually, Mulder and Scully bury the evidence in Rock Creek Park and in the bushes outside the FBI office, but not in the woods behind Mulder's apartment or in Scully's garden.

The assistant reports, "Skinner knows where they buried the evidence."

Is the assistant right?

---

### **Know-who-interview**

Lisette just started working at a newspaper company. She's researching a story on nuclear waste, and has to figure out who to interview. She and her mentor are considering Dawn, Jeff, Valentine, Colin, and Ellen.

The editor's assistant asks her, "Who do you think they will interview?"

The editor says, "I think Jeff, Valentine, and Ellen."

Actually, they interview Jeff, Valentine, and Ellen, but not Dawn.

The assistant reports, "The editor knows who they interviewed for the story."

Is the assistant right?

---

### **Know-who-hire**

Martha and Eileen are painting a mural in the cafe they own together. They're going to hire some of their friends to do the job. The head waiter and the hostess are discussing this.

The waiter asks the hostess, "Who do you think they will hire?"

The hostess says, "I think Butch, Jeff and Kat."

Actually, Martha and Eileen hire Butch, Jeff and Kat, but not Jules.

The waiter reports, "The hostess knows who they hired for painting the mural."

Is the waiter right?

## **A.2.2 False Report Context**

### **Predict-where-locate**

Jim and Mary have general admission tickets to see the popular EDC group, Ultra. There was an all-time high of attendees this year: almost 20,000 people. There aren't a ton of places to easily get a good view of the stage. Two bouncers, Spike and Angel are watching.

Spike asks Angel, "Where do you think they will locate a good spot?"

Angel says, "I think the orchestra pit and in front of the stage."

As it turns out, they found good spots on either side of the stage, and farther away on the hill in back. The orchestra pit and right at the front of the stage were bad because there were too many people.

Spike reports, "Angel predicted where they located a good spot."

Is Spike right?

---

### **Predict-where-display**

Preschoolers always make cards for their parents on Valentine's Day, and parents are expected to hang these cards up somewhere in their houses. Michelle gave three cards to her parents.

Michelle's sister Maddie asks, "Where do you think they will display your cards?"

Michelle says, "I think on the refrigerator."

Actually, their parents put two cards on the kitchen wall and one on the bedroom. No card is displayed in other places.

Maddie reports, "Michelle predicted where they displayed the cards."

Is Maddie right?

---

### **Predict-who-ask**

There are six sales associates working at Nordstroms on Black Friday. A notoriously difficult but regular customer has come into the store today. The manager and assistant manager, who usually help this customer, are very busy. They observe the new employees discussing amongst themselves who will go help the customer.

The manager asks her assistant, "Who do you think they will ask?"

The assistant says, "I think Sue, Parker and Taylor."

As it turns out, Dana, Crystal and Morgan are asked by the others to help the customer, but Sue, Parker, and Taylor are not asked.

The manager reports, "The assistant manager predicted who they asked to care for the customer."

Is the manager right?

---

### **Predict-who-contact**

Mitch and Lucy need to get hold of their kids, who are at the movies. Grandma and Grandpa are visiting, cooking dinner.

Grandma asks Grandpa, "Who do you think they will contact?"

Grandpa says, "I think Melissa."

As it turns out, Dan, Chris and Jim were contacted, but Melissa was not.

Grandma reports, "Grandpa predicted who they contacted during the movie."

Is Grandma right?

---

### **Know-where-store**

The holiday shoe sale in particular was the craziest this year, as boots were marked at least 50% off their original price. Jim and Martha went shopping and bought too many boots. Unfortunately, they live in a small apartment with little storage space. Their friends, Allen and Henry, are speculating about whether they will have to return some shoes.

Allen turns to Henry and asks, "Where do you think they will store the boots?"

Henry says, "I think the bedroom and hall closets."

Actually, the only places where there is space are under the bed, under the couch, and in the kitchen cupboard. The bedroom and hall closets are totally full.

Allen reports, "Henry knows where they stored the boots."

Is Allen right?

---

### **Know-where-sell**

Julia has just created a new perfume, and is deciding where to sell it. Her friend Paula is helping her market it. Julia's brother and sister are discussing the situation.

Her brother asks her sister, "Where do you think they will sell the perfume?"

Her sister says, "I think at Macy's and Lord and Taylor."

Actually, Julia ends up selling it at the local boutique, the pop-up and Perfumerie, but not at Macy's and Lord and Taylor.

Julia's brother reports, "My sister knows where they sold the perfume."

Is the brother right?

---

### **Know-who-invite**

Thanksgiving is tomorrow and Marissa's in-laws are hosting dinner. Marissa would like to cook something but some family members have food allergies.

She asks her husband, "Who do you think they will invite for dinner?"

Her husband says, "I think Ari, Gillian, and Tim."

It turns out, Maggy, Jim and Rick are invited, but Ari, Gillian, and Tim are not.

Marissa reports, "My husband knows who they invited for Thanksgiving dinner."

Is Marissa right?

---

### **Know-who-select**

Frannie works for a prestigious finance firm. She and her coworker Donna are wondering which brokers will be promoted at the end of this year.

Frannie asks Donna, "Who do you think they will select for a promotion?"

Donna says, "I think Mark and Bob."

In fact, Gina, Samantha and Pat are promoted, while Mark and Bob are not.

Frannie reports, "Donna knows who they selected for the promotion."

Is Frannie right?

### A.2.3 Mention-Some True Context

#### **Predict-where-view**

Mary has a special bucket list item she wishes to check off her list, and first on the list is to view the Northern Lights. She and her friend Abby are going on a road trip, from Maine to Alaska, and stopping in New York, and Ohio before going up to Minnesota and then Canada.

Mary's mom asks her dad, "Where do you think they will view the Northern Lights?" Her dad responds, "I think Alaska."

In fact, they viewed the Lights in Minnesota, Canada and Alaska, but not in New York and Ohio because it was too cloudy.

Mom reports, "Dad predicted where they viewed the Northern Lights."

Is Mom right?

---

#### **Predict-where-bury**

Dima and Masha are running from political turmoil in their home country. They first have to bury their most valuable possessions, to keep them safe from the government.

The chief of the secret police asks his lieutenant, "Where do you think they will bury their possessions?"

The lieutenant says, "I think in the stables down the street."

In fact, Masha buries their possessions in the stables and the cemetery, but not in the backyard.

The chief reports, "The lieutenant predicted where they buried their possessions."

Is the chief right?

---

#### **Predict-who-interview**

The psychologist at a local primary school is looking to hire an intern. The application process is competitive, so there is a need to conduct interviews. This year they have five candidates: John, Gwen, Greg, Sam, and Megan.

Sam asks Greg, "Who do you think they will interview?"

Greg says, "I think Megan."

It turns out that the psychologist interviews Megan, Gwen and John, but not Greg or Sam.

Sam reports, "Greg predicted who they interviewed for the internship."

Is Sam right?

---

### **Predict-who-hire**

Julia and Peter are running a summer camp, and they need to hire counselors. They are considering hiring Vera, Kristen, Jess, Morgan and Stephen. Two campers, Sue and Jill, are discussing.

Sue asks Jill, "Who do you think they will hire?"

Jill says, "I think Vera."

Julia and Peter end up hiring everyone except Stephen because he's a trouble maker.

Sue reports, "Jill predicted who they hired as a camp counselor."

Is Sue right?

---

### **Know-where-find**

Billy and his neighbors are playing hide and seek in the park. It is his turn to close his eyes and count to ten. After he is finished counting, he sees his classmate Jimmy, and asks Jimmy to help him find his friends.

Mom and Dad are watching, and Dad asks, "Where do you think they will find the kids hiding?"

Mom says, "I think under the slide."

Actually, Jimmy's friends are hidden under the slide, in the tunnel, and behind the swings, but not in the tree.

Dad reports, "Mom knows where they found the people hiding."

Is Dad right?

---

### **Know-where-hide**

Chris is always taking Alice's snacks so she wants to hide them from him. Alice and Barbara conspire to hide her food. Chris and his brother Geoff are discussing this.

Chris asks Geoff, "Where do you think they will hide the snacks?"

Geoff says, "I think in the couch."

Actually, they hide the snacks in the mattress, and in the couch, but not in the shoebox in the closet.

Chris reports, "Geoff knows where they hid the snacks."

Is Chris right?

---

#### **Know-who-recruit**

The coaches of the soccer team have decided to recruit new players for this upcoming season. Sue, Dany, Abby and Jen are all trying out.

Annie the manager asks Maggy, the water girl, "Who do you think they will recruit for the team?"

Maggy says, "I think Jen."

In fact, the coach recruits Dany, Abby, and Jen, but not Sue.

Annie reports, "Maggy knows who they recruited for the team."

Is Annie right?

---

#### **Know-who-call**

Chris is a new telemarketer trying to sell life insurance. He and his coworker Cindy are working together to expand their reach. The managers Jinny and Ezra are discussing this.

Ezra asks Jinny, "Who do you think they will call?"

Jinny says, "I think people over 60."

Actually, they called people over 60, and people under 30, but not people between 30 and 60.

Ezra reports, "Jinny knows who they called for life insurance."

Is Ezra right?

### **A.2.4 Weak Exhaustive+False Report Context**

#### **Predict-where-found**

Sparky the dog buried his toys in the backyard last week. He hid them so well that now he cannot seem to find any. Mary and Sue, Sparky's owners, search for the toys in the yard. Their neighbors Jill and Jane are watching.

Jill asks Jane, "Where do you think they will find the toys?"

Jane says, "I think behind the shed, next to the large tree, under the swing set, and under the deck."



After hours of searching, they find the toys behind the shed, next to the large tree, under the swing set, and under the deck. No toys were in the middle of the yard, on the side of the house, or near the mailbox.

Jill reports, ""Jane predicted where they found the toys."

Is Jill right?

---

### **Predict-who-recruit**

Jenna is in a sorority which is currently recruiting new members. This year, there are four pledges: Mary, Susan, Britney, and Shiela.

Jenna asks Sam, "Who do you think they will recruit?"

Sam says, "I think Susan, Britney, Shiela and Mary."

It turns out that Susan, Britney and Shiela are really great, but Mary is a huge trouble maker and gives the sorority a bad reputation. So, Susan, Britney and Shiela are recruited, but Mary is not.

Jenna reports, "Sam predicted who they recruited for the sorority."

Is Jenna right?

---

### **Predict-where-hide**

Davey eats too much chocolate. He went to Costco the other day and bought a bulk package of Ferrer Roche. He asks his friend Mackenzie to hide the chocolate for him. Davey and his sister Ruth are discussing this.

Ruth asks Davey, "Where do you think she will hide the chocolate?"

Davey says, "I think in the dresser drawers, in the linen closet, inside Davey's suitcase and in the freezer."

In fact, Mackenzie hid the chocolate in the dresser drawers, in the linen closet and inside Davey's suitcase, but not in the freezer.

Ruth reports, "Davey predicted where she hid the chocolate."

Is Ruth right?

---

### **Predict-who-call**

Ralph and Orcutt are gardeners. Their garden is festively decorated with garden gnomes, for which they have a particular predilection. One day, they notice that their gnomes have been vandalized. The police get involved, and are considering who to call.

Ralph asks Orcutt, "Who do you think they will call?"

Orcutt says, "I think the Society for Garden Well-Being, The National Gnome Association, and Gnomes Anonymous, and the American Society for the Prevention of

Cruelty to Gnomes.”

As it turns out, the police call the first three, but not the American Society for the Prevention of Cruelty to Gnomes.

Ralph reports, “Ortcutt predicted who they called about the vandalism.”

Is Ralph right?

---

### **Know-where-locate**

For a summer trip, two friends Meg and Xavier are traveling to Petra in Jordan. Petra, an ancient city, has walls surrounding the city, so you can only enter at certain places. The city administrators just had to move the entrances because the old ones caused trouble where they were.

Xavier asks Meg, “Where do you think they located the new entrances?”

Meg says, “I think at the Southeastern, Eastern, Northwestern and Western points.”

It turns out that the new entrances are actually at the Southeast, East and Northwest points, but there are no entrances at the other points.

Xavier reports, “Meg knows where they located the new entrances.”

Is Xavier right?

---

### **Know-where-display**

The Center Hall of Art is a very prestigious hall where only the most high quality art is displayed. Dan is excited because he has worked very hard on his paintings and is extremely excited to be told that they have been chosen to be displayed in the Center Hall of Art.

Dan asks his dad, “Where do you think they will display the paintings?”

Dan’s dad says, “I think the front foyer, the velvet curtain room, the blue room, and the downstairs lobby.”

It turns out, the curators display Dan’s paintings in the front foyer, the velvet curtain room and the blue room, but not the downstairs lobby or the back room.

Dan reports, “Dad knows where they displayed the paintings.”

Is Dan right?

---

### **Know-who-ask**

Tim and Jen need some advice about what they should do after high school because they’re not sure about going to college just yet. They have several friends who like to give

advice: Jim, Kate, Fran, Jess, and Connie. Kate and Fran are discussing this.

Kate asks Fran, "Who do you think they will ask?"

Fran says, "I think Jim, you, me and Jess."

It turns out that Tim and Jen ask Jim, Kate and Fran, but not Jess or Connie.

Kate reports, "Fran knows who they asked for advice."

Is Kate right?

---

### **Know-who-contact**

Jafari and Marjane are planning a surprise party for their mother. They want to ask several of her friends to help out. They are considering: Susan, Anita, Simone, and Hazel. Simone and Anita are discussing.

Anita asks Simone, "Who do you think they will contact for the party?"

Simone responds, "I think Susan, Anita, Simone, and Hazel."

In fact, they ask Susan, Anita and Simone, but not Hazel.

Anita reports, "Simone knows who they contacted about the party."

Is Anita right?

---

### **A.3 Fillers**

- (186) Which of the following creatures is not a mammal?
  - a. Chimpanzees
  - b. Chickens
  - c. Humans
  - d. Wolves
- (187) Which of the following countries is not in Africa?
  - a. France
  - b. Nigeria
  - c. Ghana
  - d. Algeria
- (188) Which of the following people is not a comedian?
  - a. Amy Poehler
  - b. Tina Fey
  - c. Angela Merkel
  - d. Conan O'Brien
- (189) Which of the following people is not a US president?

- a. Thomas Jefferson
  - b. Lady Gaga
  - c. John Adams
  - d. George Washington
- (190) Which of the following properties don't all bugs have?
- a. Six legs
  - b. An exoskeleton
  - c. Antennae
  - d. Fur

## Appendix B

### Stimuli for Experiment 2

Factors: Stakes (high, low), Tense (-,+), Response (Weak-Exh, MS, MO, FR), Informativity (Max, Min).

#### B.1 High Stakes

##### Oysters

Scientists have discovered a new strain of a dangerous virus that has contaminated oysters in the Mid-Atlantic. The Center for Disease Control is trying to prevent as much contamination as possible by tracking down all the oysters.

In this area, luckily only 6 restaurants usually buy oysters from the contaminated area. They have been ranked by the number of oysters crates each restaurant has purchased:

Restaurant A ordered 40 crates,  
 Restaurant B ordered 32,  
 Restaurant C ordered 20,  
 Restaurant D ordered 16,  
 Restaurant E ordered 4, and  
 Restaurant F ordered 0.

The supervisor for this county asks his inspectors, "Where should we check for contaminated oysters?"

Inspector A says, "ANSWER."

Inspector B says, "ANSWER."

Inspector C says, "ANSWER."

Who knows where to check for contaminated oysters? (Choose all that apply)

---

##### Firefighters

A local apartment building has caught on fire. The fire department has been called, and firefighters are currently on their way. The landlord has a list showing the number of tenants on each floor. The floors are ordered by how many tenants each one has:

The fifth floor is ranked highest, with 20 residents,  
 the second floor is next, with 16 residents,  
 Then the fourth floor with 10,  
 the third floor with 4,

the sixth floor with 4, and  
the first floor is empty.

The fire chief is deciding where to send his firefighters, because there are people trapped but they don't know on which floors. He asks his firefighters, "Where should we go to find the trapped people?"

Firefighter A says, "ANSWER."

Firefighter B says, "ANSWER."

Firefighter C says, "ANSWER."

Who knows where to look for the trapped people? (Choose all that apply)

---

### **Protests**

Violent protests have erupted throughout the city due to recent legislation from the corrupt government. Several intellectuals have been seized and unlawfully detained for questioning in several parts of the city. In actuality, the following list shows where captured intellectuals are held within the city.

The Northeast district houses the most, at 10 captured intellectuals,  
the Southwest district houses 8,  
the South district houses 5,  
the Southeast district, 2,  
the North district has the least, only a single captured intellectual, and finally  
the West district has none.

An anti-government group plans to break the captured intellectuals free before they are tried and inevitably executed. The leader asks three of her top operatives, "Where should we go to rescue these prisoners?"

Operator A says, "ANSWER."

Operator B says, "ANSWER."

Operator C says, "ANSWER."

Who knows where to rescue the prisoners? (Choose all that apply)

---

### **Terrorism**

The Capitol Police have just gotten word of a possible terrorist attack targeting specific stores in the area. An independent consultancy firm has calculated the risk of certain stores to be targeted. The firm has not yet released the study, but has ranked the stores from high risk to low risk:

Store E is most at risk, with a .5 probability,  
Store B is next with .4 probability,  
Store A has a .25 probability,  
Store D, a .1 probability,

Store F, a .05 probability, and  
Store C is least at risk, with a 0 probability.

The Chief asks his three top advisors, "Where should we set up extra surveillance?"

Advisor A says, "ANSWER."

Advisor B says, "ANSWER."

Advisor C says, "ANSWER."

Who knows where to set up extra surveillance? (Choose all that apply)

---

### **Killer**

A serial killer is on the loose, and has kidnapped several people. FBI forensic analysts have determined a ranking for the most likely places where the victims might be found (where a higher number indicates more likely):

Place F is ranked at the top as the most likely place where the killer is operating.

Place A is next,

then Place B,

Place C,

Place E, and finally

Place D is ranked last, as the least likely place.

The local state police detective working the case asks her three chief investigators, "Where should we search for the kidnapped people?"

Investigator A says, "ANSWER."

Investigator B says, "ANSWER."

Investigator C says, "ANSWER."

Who knows where to search for the kidnapped people? (choose all that apply)

## **B.2 Low Stakes**

### **Picture**

Mark is visiting New York City for the first time, and wants to take the best pictures possible to show his family back home. The Ultimate Guide to New York City 2018 gives the following ranking for places where tourists can snap great pictures of the city:

Location A was voted the best, and won 5/5 stars,

Location C won 4 stars,

Location D, 3,

Location E, 2,

Location F, 1, and

Location B was voted the worst, and so won no stars.

Mark asks three of his cousins who live in New York, "Where should I go to see the city?"

Cousin A says, "ANSWER."

Cousin B says, "ANSWER."

Cousin C says, "ANSWER."

Who knows where to see the city? (Choose all that apply)

---

### **Diners**

Liz just moved to Los Angeles. She loves exploring classic diners. The New City Goner's Guide to LA reviewed several diners, based on customer satisfaction. Six classic diners were ranked:

Diner C was voted best,  
followed by Diner F at second,  
Diner A was third,  
Diner D fourth,  
Diner E fifth, and  
Diner B was voted sixth.

Liz asks three of her local friends, "Where should I go to eat out?"

Friend A says, "ANSWER."

Friend B says, "ANSWER."

Friend C says, "ANSWER."

Who knows where to eat out in LA? (Choose all that apply)

---

### **Coffee**

Johanna is new to Minneapolis and wants to try local coffee shops. The Ultimate Coffee Guide 2018 ranks cafes on a ten-point scale, where ten is the highest number of points. Minneapolis has the following ranking for coffee roasteries:

Cafe E has 10 stars,  
Cafe B has 8,  
Cafe F has 5,  
Cafe C has 2,  
Cafe D has 1, and  
Cafe A has 0.

She asks three classmates who are originally from the city, "Where should I get coffee?"

Classmate A says, "ANSWER."

Classmate B says, "ANSWER."



Classmate C says, "ANSWER."

Who knows where to get coffee? (Choose all that apply)

---

### **Yoga**

Julia has just moved to the area, and is trying out different yoga studios. Yogi's Choice, a popular yoga magazine, has ordered the local yoga studios by their popularity:

Studio F is ranked first for popularity,  
 Studio E is the next popular,  
 Studio D is third popular,  
 Studio C is fourth,  
 Studio B is fifth, and  
 Studio A is last.

Julia, who doesn't have a subscription, asks three coworkers, "Where should I go for yoga?"

Coworker A says, "ANSWER."

Coworker B says, "ANSWER."

Coworker C says, "ANSWER."

Who knows where to go for yoga? (Choose all that apply)

---

### **Market**

Bruce is visiting his family in Pennsylvania and wants to visit the local Amish market. He is most interested in artisanal woodworking. Some stalls in the market have won prizes for their pieces, while others have not:

Artisan stall C is the most popular, and has won 5 awards,  
 Stall D has won 4,  
 Stall A has 3,  
 Stall F has 2,  
 Stall B has 1, and  
 Stall E has not won any awards.

Bruce asks his brothers, "Where should we go for woodwork?"

Brother A says, "ANSWER."

Brother B says, "ANSWER."

Brother C says, "ANSWER."

Who knows where to go for woodwork? (Choose all that apply)

### B.3 Fillers

---

#### How

Andy loves to cook and she is always looking for new recipes to try. She is attending a potluck and wants to impress her friends with a novel dish.

She finds several recipes from food blogs on the internet, and a couple from an old cookbook. She also asks her friend Paul, who gives her a traditional recipe from his family. In the end, she decides to make the dish from Paul's family.

At the potluck, everyone complements the dish. The host asks three of the dinner guests, "How did Andy find that recipe?"

Guest A says, "She looked at food blogs."

Guest B says, "She asked Paul."

Guest C says, "She looked on the internet, in cookbooks and she asked Paul."

Who knows how Andy found the recipe? (Choose all that apply)

---

#### What

Tyler and four of his coworkers are in a crowded bar. Tyler, telling a joke, delivers the punchline: "And then the dog goes, 'Meow'!"

The bar is very noisy, so when Tyler leaves for the bathroom, one of the coworkers asks the others, "What do you think he said?"

Coworker A says, "And then the dog meowed."

Coworker B says, "Something about meowing."

Coworker C says, "The dog barked."

Who knows what Tyler said? (Choose all that apply)

---

#### When

Yesterday, a crime was committed between 9 and 10pm. It included a murder, a theft, and vandalism. The police department is trying to get the timeline straight, so they can trick one of the suspects. However, they don't know the exact sequence of events.

The detective asks her lieutenants, "When do you think the murder was committed?"

Lieutenant A says, "Close to 10."

Lieutenant B says, "9:30."

Lieutenant C says, "Yesterday."

In reality, the murder happened at 9:20, the theft happened at 9:27, and the vandalism at 9:51.

Who knows when the murder was committed?

---

### **Why**

Mark used to work at a bank but last week he was fired. Given the recent indiscretions and abuses of power that bankers, banks are cracking down on conduct.

Mark's uncle asks Mark's three siblings, "Why do you think Mark got fired from his job?"

Sibling 1 says, "Because he embezzled and manipulated the market."

Sibling 2 says, "Because he embezzled."

Sibling 3 says, "I don't know."

Actually, Mark was fired for his involvement in market manipulation as well as embezzlement.

Who knows why Mark was fired? (Choose all that apply)

## Appendix C

### Stimuli for Experiment 3a

#### C.1 Test Items

##### C.1.1 How

###### (191) POLITICAL - MODAL

Dima and Masha are running from political turmoil in their home country. They first have to hide their most valuable possessions, to keep them safe from the government.

They can bury some in the local cemetery, plaster some in the walls of the house, bind others up in old books. They can't deposit anything in the bank because the police will find those easily.

Their friends Sue and George are worried. George asks Sue, "How can they hide their valuables?"

Based on Sue's answer, George concludes, "Sue knows how Dima and Masha can hide their valuables."

- a. How acceptable is it for Sue to give an answer like...?
- b. How likely is it that Sue gave an answer like...

###### (192) POLITICAL - NOMODAL

Dima and Masha are running from political turmoil in their home country. They first have to hide their most valuable possessions, to keep them safe from the government.

They buried some in the local cemetery, plastered some in the walls of the house, bound others up in old books. They didn't deposit anything in the bank because the police will find those easily.

Their friends Sue and George are worried. George asks Sue, "How did they hide their valuables?"

Based on Sue's answer, George concludes, "Sue knows how Dima and Masha hid their valuables."

- a. How acceptable is it for Sue to give an answer like...?
- b. How likely is it that Sue gave an answer like...

(193) **PETRA - MODAL**

For a summer trip, two friends Meg and Xavier are traveling to Petra in Jordan. Petra, an ancient city, has walls surrounding the city, so you can only enter at certain places and you have to pay an entrance fee.

They will be there for multiple days. They can sneak into the city, pay the entrance fee, and they can work in exchange for free entrance. They can't apply for student passes, because they have already graduated.

Their two friends Tonia and Jill are discussing Meg and Xavier's trip. Tonia asks Jill, "How can they get into Petra?"

Based on Jill's answer, Tonia concludes, "Jill knows how they can get into Petra."

- a. How acceptable is it for Jill to give an answer like...?
- b. How likely is it that Jill gave an answer like...

(194) **PETRA - NOMODAL**

For a summer trip, two friends Meg and Xavier are traveling to Petra in Jordan. Petra, an ancient city, has walls surrounding the city, so you can only enter at certain places and you have to pay an entrance fee.

They were there for multiple days. One day they snuck into the city, one day they paid the entrance fee, and one day they worked in exchange for free entrance. They also had the option to apply for student passes, but they did not choose that option.

Their two friends Tonia and Jill are discussing Meg and Xavier's trip. Tonia asks Jill, "How did they get into Petra?"

Based on Jill's answer, Tonia concludes, "Jill knows how they got into Petra."

- a. How acceptable is it for Jill to give an answer like...?
- b. How likely is it that Jill gave an answer like...

(195) **COLLEGE - MODAL**

Tim needs some advice about what he should do after high school because he's not sure about going to college just yet.

He can ask his friends for advice, read several coming-of-age memoirs about college, and he go to the guidance counselor's office. He can't really ask his

parents, because they have already decided that he must go to college.

His brother asks his sister, "How can Tim decide about college?"

Based on his sister's answer, Tim's brother reports, "'She knows how Tim can decide about college."

- a. How acceptable is it for his sister to give an answer like...?
- b. How likely is it that his sister gave an answer like...

(196) **COLLEGE - NOMODAL**

Tim needs some advice about what he should do after high school because he's not sure about going to college just yet.

He asked his friends for advice, he read several coming-of-age memoirs about college, and then he went to the guidance counselor's office. He thought about asking his parents' advice, but didn't do that.

His brother asks his sister, "How did Tim decide about college?"

Based on his sister's answer, Tim's brother reports, "She knows how Tim decided about college."

- a. How acceptable is it for his sister to give an answer like...?
- b. How likely is it that his sister gave an answer like...

## C.1.2 Where

(197) **FIDO - MODAL**

Fido the dog buried his toys in the backyard last week. He hid them so well that now he cannot seem to find any. A neighbor, Jill, comes over to help Mary, Fido's owner, find the toys in the yard.

Fido can hide his toys behind the shed, next to the large tree, under the swing set, and under the deck. But not in the middle of the yard, on the side of the house, or near the mailbox.

Mary asks Jill, "Where can Fido hide his toys?"

Based on Jill's answer, Mary concludes, "Jill knows where Fido can hide his toys."

- a. How acceptable is it for Jill to give an answer like...?

b. How likely is it that Jill gave an answer like...

(198) **FIDO - NOMODAL**

Fido the dog buried his toys in the backyard last week. He hid them so well that now he cannot seem to find any. A neighbor, Jill, comes over to help Mary, Fido's owner, find the toys in the yard.

Fido hid his toys behind the shed, next to the large tree, under the swing set, and under the deck. No toys were in the middle of the yard, on the side of the house, or near the mailbox.

Mary asks Jill, "Where did Fido hide his toys?"

Based on Jill's answer, Mary concludes, "Jill knows where Fido hid his toys."

a. How acceptable is it for Jill to give an answer like...?

b. How likely is it that Jill gave an answer like...

(199) **CHOCOLATE - MODAL**

Davey bought too much chocolate from Costco the other day. He asks his friend Mackenzie to hide the chocolate for him, or else he will eat it all.

Mackenzie can store the chocolate in the dresser drawers, in the linen closet, and inside Davey's suitcase, but not in the freezer or in Davey's desk.

Later, Davey asks his friend Joe, "Where can Mackenzie store the chocolate?"

Given Joe's answer, Davey concludes, "Joe knows where Mackenzie can store the chocolate."

a. How acceptable is it for Joe to give an answer like...?

b. How likely is it that Joe gave an answer like...

(200) **CHOCOLATE - NOMODAL**

Davey bought too much chocolate from Costco the other day. He asks his friend Mackenzie to hide the chocolate for him, or else he will eat it all.

Mackenzie stored the chocolate in the dresser drawers, in the linen closet, and inside Davey's suitcase, but not in the freezer or in Davey's desk.

Later, Davey asks his friend Joe, "Where did Mackenzie store the chocolate?"

Given Joe's answer, Davey concludes, "Joe knows where Mackenzie stored the chocolate."

- a. How acceptable is it for Joe to give an answer like...?
- b. How likely is it that Joe gave an answer like...

(201) **HIDEESEEK - MODAL**

Billy, Susie and their neighbors are playing hide and seek in the park. It is his turn to close his eyes and count to ten.

His friends can hide under the slide, in the tunnel, and behind the swings, but not in the tree.

Later, Billy's mom asks Susie's dad, "Where can the kids hide?"

Based on Susie's dad's answer, and Billy's mom reports, "Susie's dad knows where the kids can hide."

- a. How acceptable is it for Susie's dad to give an answer like...?
- b. How likely is it that Susie's dad gave an answer like...

(202) **HIDEESEEK - NOMODAL**

Billy, Susie and their neighbors are playing hide and seek in the park. It is his turn to close his eyes and count to ten.

His friends hide under the slide, in the tunnel, and behind the swings, but not in the tree.

Later, Billy's mom asks Susie's dad, "Where did the kids hide?"

Based on Susie's dad's answer, and Billy's mom reports, "Susie's dad knows where the kids hid."

- a. How acceptable is it for Susie's dad to give an answer like...?
- b. How likely is it that Susie's dad gave an answer like...

(203) **HOLLYWOOD - MODAL**

Zack is going on vacation to California and really wants to see the Hollywood Sign.

He can see the sign while hiking in Beachwood Canyon, while walking through Lake Hollywood Park, and while visiting the Griffith Observatory. However, he can't see it from Downtown or while hiking in Runyon Canyon Park.

Later, his dad asks his sister Fiona, "How can Zack see the Hollywood sign?"

Based on Fiona's response, his dad concludes, "Fiona knows how Zack can see the Hollywood sign."



- a. How acceptable is it for Fiona to give an answer like...?
- b. How likely is it that Fiona gave an answer like...

(204) **HOLLYWOOD - NOMODAL**

Zack is going on vacation to California and really wants to see the Hollywood Sign.

He can see the sign while hiking in Beachwood Canyon, while walking through Lake Hollywood Park, and while visiting the Griffith Observatory. However, he can't see it from Downtown or while hiking in Runyon Canyon Park.

Later, his dad asks his sister Fiona, "How did Zack see the Hollywood sign?"

Based on Fiona's response, his dad concludes, "Fiona knows how Zack saw the Hollywood sign."

- a. How acceptable is it for Fiona to give an answer like...?
- b. How likely is it that Fiona gave an answer like...

(205) **BUCKET LIST - MODAL**

Mary has a special bucket list item she wishes to check off her list, and first on the list is to view the Northern Lights. She and her friend Abby are going on a road trip, from Maine to Alaska, and stopping in New York, and Ohio before going up to Minnesota and then Canada.

They can see the Northern Lights in Maine, Alaska and Canada, but not New York or Ohio.

Mary's daughter asks Abby's sister, "Where can they see the Northern Lights?"

Based on Abby's sister's response, Mary's daughter concludes, "Abby's sister knows where they can see the Northern Lights."

- a. How acceptable is it for Abby's sister to give an answer like...?
- b. How likely is it that Abby's sister gave an answer like...

(206) **BUCKET LIST - NOMODAL**

Mary has a special bucket list item she wishes to check off her list, and first on the list is to view the Northern Lights. She and her friend Abby are going on a road trip, from Maine to Alaska, and stopping in New York, and Ohio before going up to Minnesota and then Canada.

They saw the Northern Lights in Maine, Alaska and Canada, but not New York or Ohio.

Mary's daughter asks Abby's sister, "Where did they see the Northern Lights?"

Based on Abby's sister's response, Mary's daughter concludes, "Abby's sister knows where they saw the Northern Lights."

- a. How acceptable is it for Abby's sister to give an answer like...?
- b. How likely is it that Abby's sister gave an answer like...

### C.1.3 Who

#### (207) OFFICE - MODAL

Christina and Gabe are deciding who they're going to select for office party planning committee this year. They can ask Bill, Jimmy, Cate, and Veronica because they're not too busy. Sam and Ezra already have too many obligations to be on the committee.

Their boss asks the manager, "Who can Christina and Gabe select?"

Based on the manager's answer, the boss concludes, "The manager knows who Christina and Gabe can select."

- a. How acceptable is it for the manager to give an answer like...?
- b. How likely is it that the manager gave an answer like...

#### (208) OFFICE - NOMODAL

Christina and Gabe are deciding who they're going to select for office party planning committee this year.

They ask Bill, Jimmy, Cate, and Veronica, but not Sam or Ezra to be on the committee.

Their boss asks the manager, "Who did Christina and Gabe select?"

Based on the manager's answer, the boss concludes, "The manager knows who Christina and Gabe selected."

- a. How acceptable is it for the manager to give an answer like...?
- b. How likely is it that the manager gave an answer like...

(209) **CUSTOMER - MODAL**

There are six sales associates working at Nordstrom's on Black Friday. A notoriously difficult but regular customer has come into the store today. The manager and assistant manager, who usually help this customer, are very busy.

Dana, Crystal and Molly are all very professional sales associates, and can help customer with their needs. Parker and Taylor can be unhelpful and inattentive to customers.

The manager asks the assistant manager, "Who can help the customer?"

Based on the assistant manager's answer, the manager concludes, "The assistant manager knows who can help the customer."

- a. How acceptable is it for the assistant manager to give an answer like...?
- b. How likely is it that the assistant manager gave an answer like...

(210) **CUSTOMER - NOMODAL**

There are six sales associates working at Nordstrom's on Black Friday. A notoriously difficult but regular customer has come into the store today. The manager and assistant manager, who usually help this customer, are very busy.

Dana, Crystal and Molly are all very professional sales associates, and helped the customer with their needs. Parker and Taylor were unhelpful and inattentive to the customer.

The manager asks the assistant manager, "Who helped the customer?"

Based on the assistant manager's answer, the manager concludes, "The assistant manager knows who helped the customer."

- a. How acceptable is it for the assistant manager to give an answer like...?
- b. How likely is it that the assistant manager gave an answer like...

(211) **INTERN - MODAL**

The psychologist at a local primary school is looking to hire some interns. This year they have five candidates: John, Gwen, Greg, Sam, and Megan.

The psychologist can interview Gwen, John and Greg, but not Sam or Megan because they're underqualified.

The vice principle asks the psychologist's assistant, "Who can the psychologist interview?"

Based on the assistant's response, the vice principle concludes, "The assistant

knows who the psychologist can interview.”

- a. How acceptable is it for the assistant to give an answer like...?
- b. How likely is it that the assistant gave an answer like...

(212) **INTERN - NOMODAL**

The psychologist at a local primary school is looking to hire some interns. This year they have five candidates: John, Gwen, Greg, Sam, and Megan.

The psychologist interviewed Gwen, John and Greg, but not Sam or Megan because they're underqualified.

The vice principle asks the psychologist's assistant, "Who did the psychologist interview?"

Based on the assistant's response, the vice principle concludes, "The assistant knows who the psychologist interviewed."

- a. How acceptable is it for the assistant to give an answer like...?
- b. How likely is it that the assistant gave an answer like...

## Appendix D

### Stimuli for Experiment 3b

#### D.1 Test Items

##### D.1.1 High Stakse

###### (213) OYSTERS

Scientists have discovered a new strain of a dangerous virus that has contaminated oysters in the Mid-Atlantic. The Center for Disease Control is trying to prevent as much contamination as possible by tracking down the oysters which were sold to restaurants.

The CDC supervisor is tasked with tracking down the oysters. With this goal in mind, she asks her task force

- a. "Where can we locate the contaminated oysters?"
- b. "Where are the contaminated oysters located?"

In fact, the oysters were delivered to Restaurants A, B, C, and D, but not Restaurant E.

**Please rate the acceptability of the following answer to the Supervisor's question.**

###### (214) FIREFIGHTERS

A local apartment building has caught on fire. The fire department has been called, and firefighters have just arrived.

The fire chief wants to ensure that the firefighters save as many tenants as possible. With this goal in mind, the chief asks his firefighters

- a. "Where can we locate the trapped people?"
- b. "Where are the trapped people located?"

In fact, there are people trapped on Floors A, B, C, and D, but not Floor E.

**Please rate the acceptability of the following answer to the chief's question.**

**(215) PROTESTS**

Violent protests have erupted throughout the city due to recent unpopular legislation. Several protesters have been captured and held.

An anti-government group is planning to rescue the captured protesters for fear of what might happen to them. With this goal in mind, the leader asks her operatives

- a. "Where can we locate the imprisoned people?"
- b. "Where are the imprisoned people located?"

In fact, prisoners are being held in Prisons A, B, C, and D, but not in Prison E.

**Please rate the acceptability of the following answer to the leader's question.**

**(216) TERRORISM**

The Capitol Police have just gotten word of imminent terrorist attacks targeting stores in the area. The police are collecting information about the stores.

The Chief of Police is responsible for preventing as much damage as possible. With this goal in mind, he asks his advisors

- a. "Where can we locate the targeted stores?"
- b. "Where are the targeted stores located?"

In fact, the targeted stores are located on Streets A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to the chief's question.**

**(217) ENVELOPES**

A disgruntled citizen has sent suspicious envelopes to various government officials. The FBI is trying to narrow down the offices.

The lead detective wants to start sending in teams right away to avoid harm to the office workers. With this goal in mind, she asks her team

- a. "Where can we locate the contaminated envelopes?"
- b. "Where are the contaminated envelopes located?"

In fact, the envelopes are located at Offices A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to the detectives's question.**

**(218) RABIES**

The local Animal Control Center has received calls about several animals infected with rabies. These rabid animals have been loose for the past 24 hours.

The director of the center is in charge of finding the infected animals, to prevent any further transmission of rabies. With this goal in mind, he asks his team

- a. "Where can we locate the bitten animals?"
- b. "Where are the bitten animals located?"

In fact, the bitten animals are located in Neighborhoods A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to the director's question.**

### **D.1.2 Low Stakes**

#### **(219) PICTURE**

Mark is visiting New York City for the first time. He has heard the city has great museums.

He wants to see museums on his trip. With this goal in mind, he asks the waiter at a restaurant

- a. "Where can we locate the museums?"
- b. "Where are the museums located?"

In fact, the museums are located on Streets A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Mark's question.**

#### **(220) FOOD**

Liz has just moved to New Jersey. She loves eating Italian food.

She thinks that her roommate, who loves Italian food, will know about the restaurants that serve Italian food. With this goal in mind, she asks her roommate

- a. "Where can we locate the Italian restaurants?"
- b. "Where are the Italian restaurants located?"

In fact, the Italian restaurants are in Towns A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Liz's question.**

#### **(221) COFFEE**

Johanna is new to Minneapolis. She loves drinking espresso.

She thinks her new roommate will know about the coffee shops. With this goal in mind, she asks her roommate

- a. "Where can we locate the coffee shops?"
- b. "Where are the coffee shops located?"

In fact, the coffee shops are at Places A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Johanna's question.**

(222) **YOGA**

Billy has just moved to the area. He wants to start practicing yoga.

He thinks that locals will know about the yoga studios. With this goal in mind, he asks the people at a yoga-in-the-park event

- a. "Where can we locate the yoga studios?"
- b. "Where are the yoga studios located?"

In fact, the yoga studios are in Neighborhoods A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Billy's question.**

(223) **MARKET**

Bruce and his family are visiting Amish country in Pennsylvania. He has heard that they are skilled wood-workers.

He thinks the owner of the bed and breakfast where they're staying will know something about the woodworking shops. With this goal in mind, he asks her

- a. "Where can we locate the woodworking shops?"
- b. "Where are the woodworking shops located?"

In fact, the shops are located on Routes A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Bruce's question.**

(224) **BIKE**

Kelly has decided to become more active. She joined a cycling club and wants to check out the bike shops.

She thinks that other members of the cycling club will know about the bike shops. With this goal in mind, she asks a club member

- a. "Where can we locate the bike shops?"
- b. "Where are the bike shops located?"

In fact, the bike shops are located in Neighborhoods A, B, C, and D, but not E.

**Please rate the acceptability of the following answer to Kelly's question.**



## Appendix E

### Additional graphs for Corpus Study

#### E.1 Modal Who-questions

##### (225) **can/could**

- a. Who can it be? (#47846)  
 Who can say? (#82102)  
 Who can tell me? (#160158)  
 Who can honestly say that Essex man was completely misguided? (#41424)
- b. Who could have done that? (#28688)  
 Who could it be? (#119716)  
 Who could she tell? (#45669)  
 Who could tell? (#209633)

##### (226) **would/will**

- a. WHO would have thought that those Spandau Ballet boys would have turned out to be such fine thespians? (#27980)  
 Who would have thought it? (#28948)  
 Who wouldn't be? (#164675)  
 WHO in his right mind would want an American bank anyway? (#174517)  
 who would be that cruel? (#393204)
- b. seems like only one person? Who will be the final arbiter? (#223782)  
 Who will be doing the interview? (#150540)  
 Who will these suckers be? (#209926)

##### (227) **must/may/might**

- a. Who then might this victim be? (#251676)
- b. **should/shall**
  - a. Who should be involved in treatment sessions? (#87590)
  - b. Who shall we have over for dinner? (#317790)

##### (228) **can/could**

- a. Just see who can be sick first I think. (#250976)  
 It's not knowing who I can be assertive with. (#250976)  
 I do not know who I can get to write for me. (#310971)  
 The object of the game is to see who can shake it off in the shortest time

without using their hands. (#363555)

Oh I don't know who that can be. (#396564)

- b. They competed to see who could eat most in the hotel restaurant. (#28623)  
Yeah, I don't know who I could ask though really, Joe Bloggs up the street. (#158943)

(229) **would/will**

- a. I wondered who would forgive Goreng. (#40581s)  
I know who the lads would rather listen to. (#292801)  
She wondered who would buy this house. (#111592)
- b. You know who it will be?. (#59948)  
He will decide who else will be employed. (#245090)  
It's not yet known who will take up his position in Gloucestershire. (#302515)  
The only problem is who will hold that covering position? (#216789)

(230) **must/may/might**

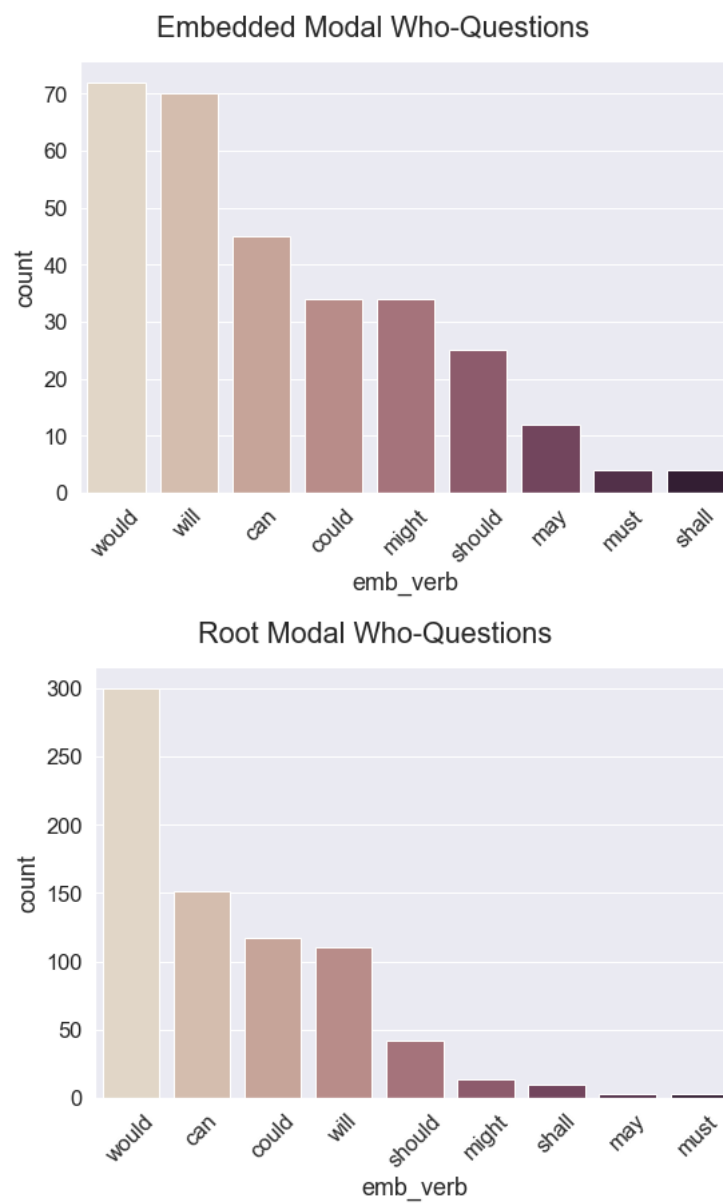
- a. I know who it must have been. (#27835)  
Lisa knew who it must be. (#308988)
- b. You never knew who might be listening. (#199255)  
You never know who else might come in. (#29395)
- c. 106411 Again, you do not know who may be listening. (#)

(231) **should/shall**

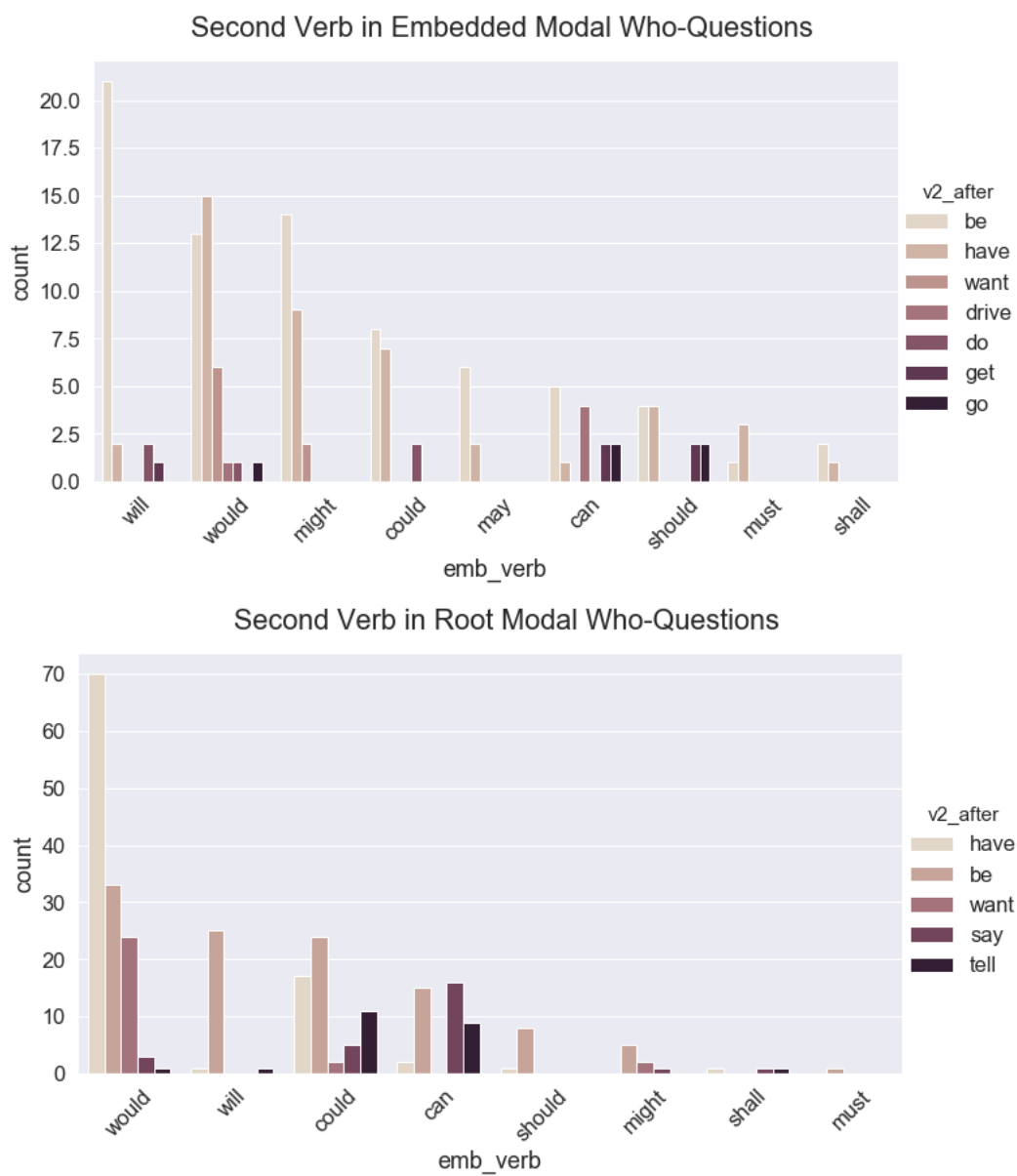
- a. Many experiments were done to decide who should have responsibility for controlling the sound (#16566)  
The potentially most divisive argument will be about who should be in charge during the dangerous period ahead. (#148484)

## E.2 Google searches for surprise and predict

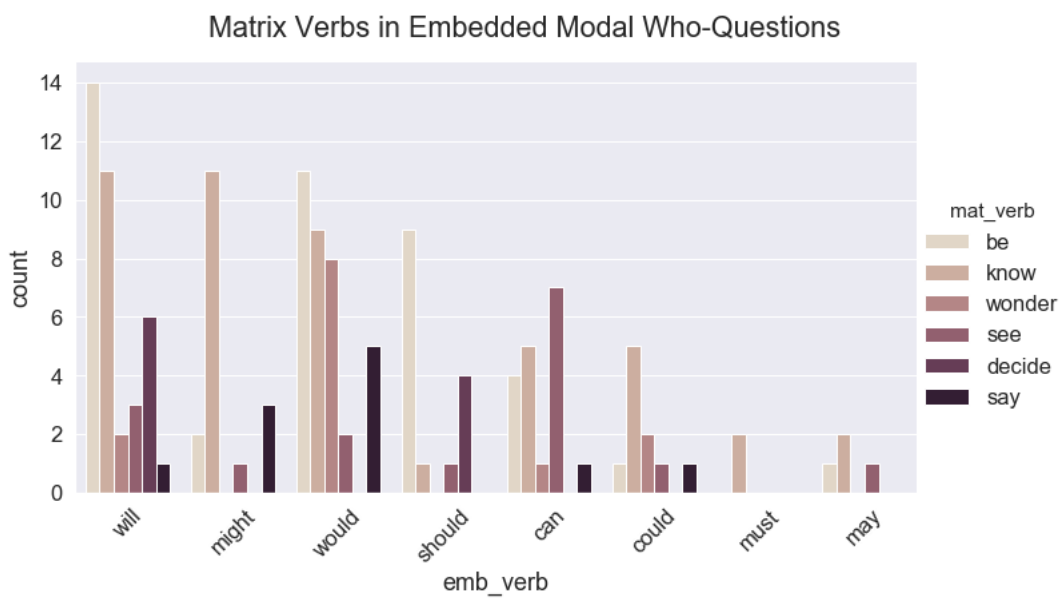
### E.2.1 surprise



**Figure E.1:** Modals Finite Root and Embedded who-questions.



**Figure E.2:** Most frequent second verbs in Modal Root and Embedded who-questions.



**Figure E.3:** Most frequent matrix verbs in Modal Embedded who-questions.

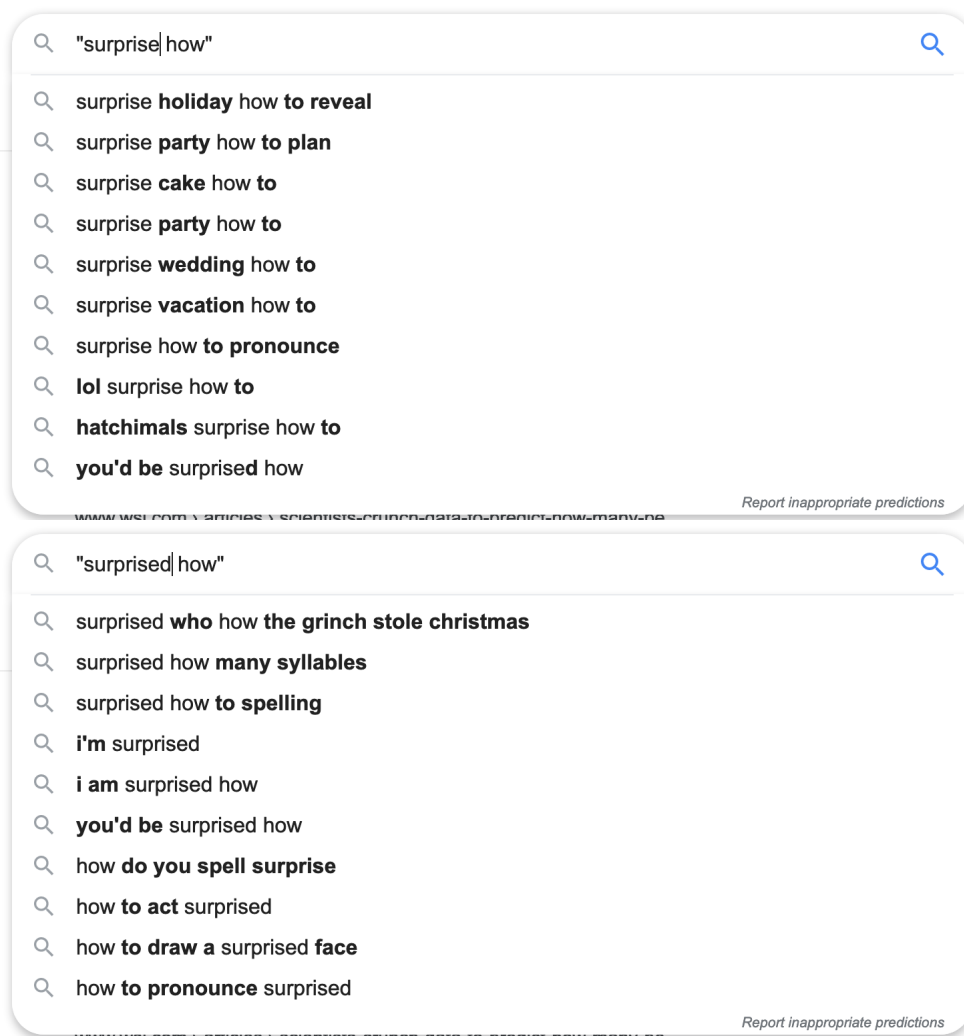
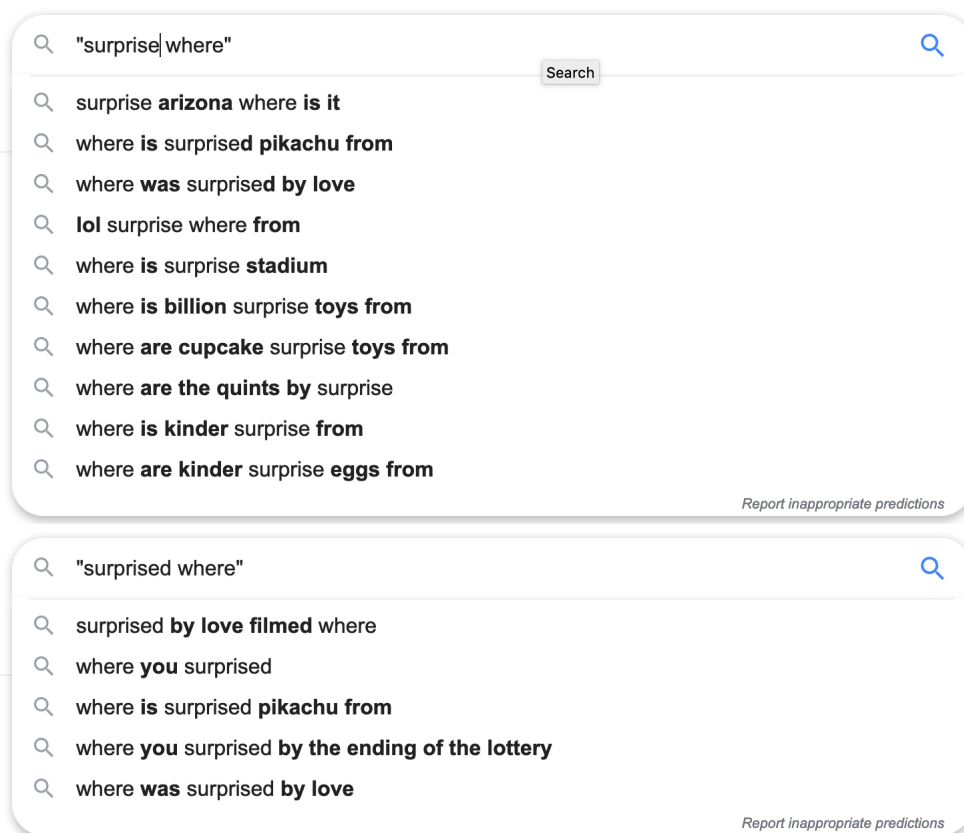


Figure E.4: Google predictive searching for surprise/surprised-how bigrams.



**Figure E.5:** Google predictive searching for surprise/surprised-where bigrams.

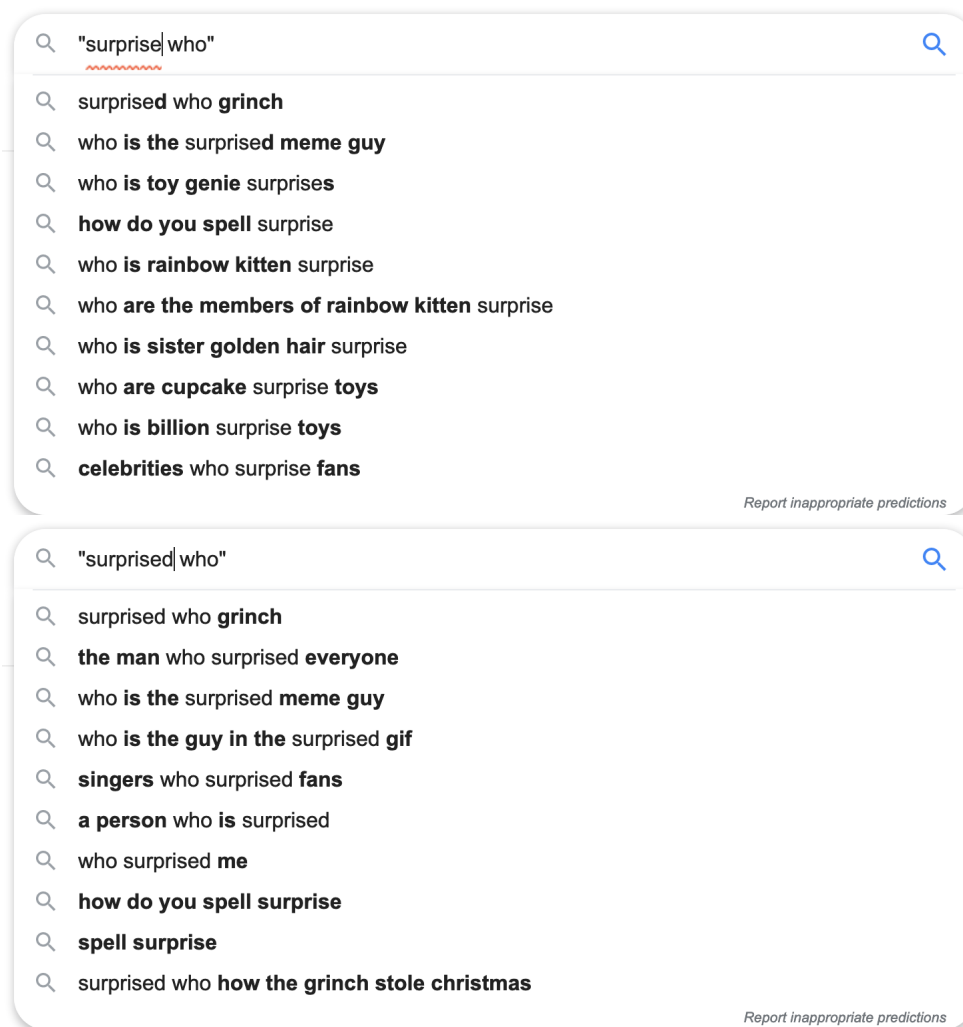


Figure E.6: Google predictive searching for surprise/surprised-who bigrams.



## E.2.2 predict

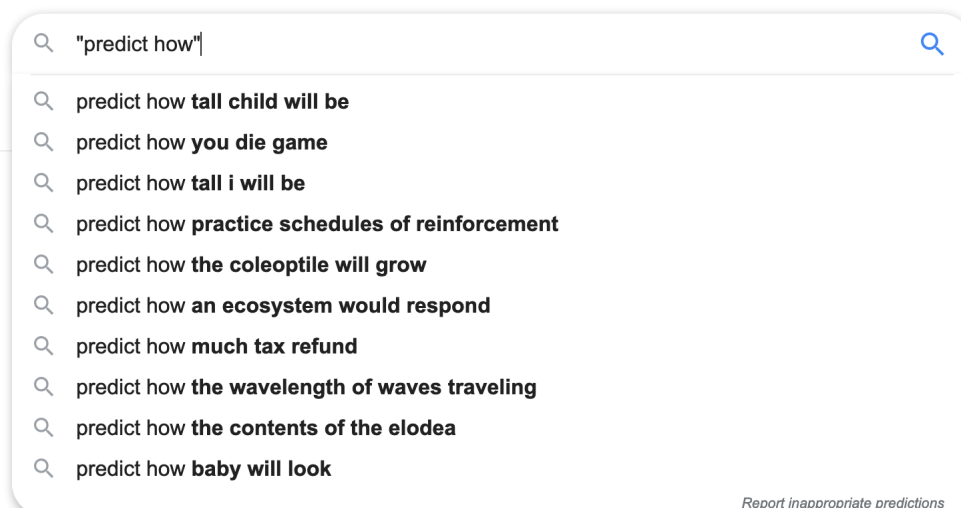


Figure E.7: Google predictive searching for predict-how bigram.

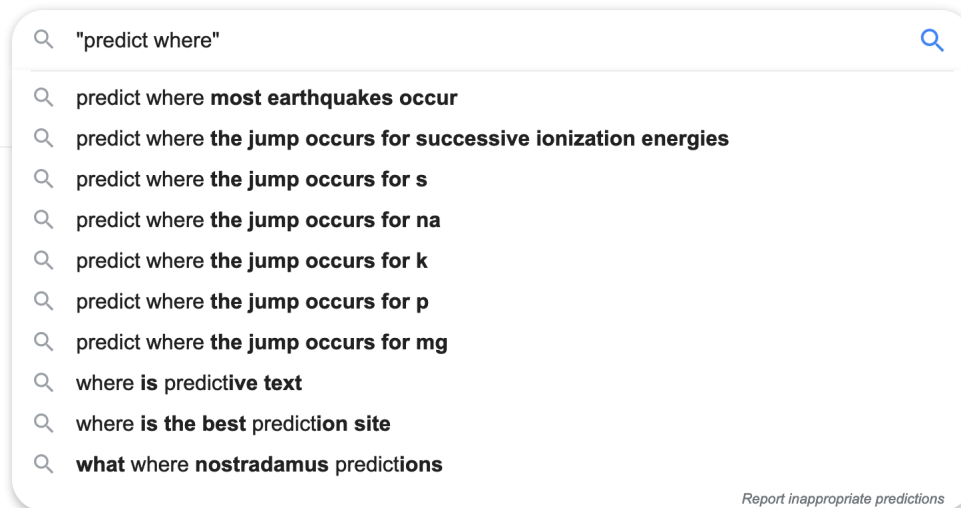
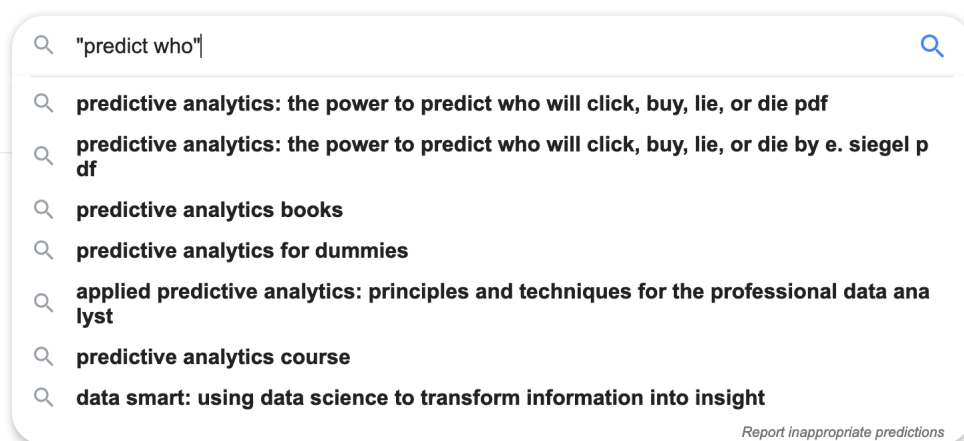


Figure E.8: Google predictive searching for predict-where bigram.



**Figure E.9:** Google predictive searching for predict-who bigram.

### E.3 Modal

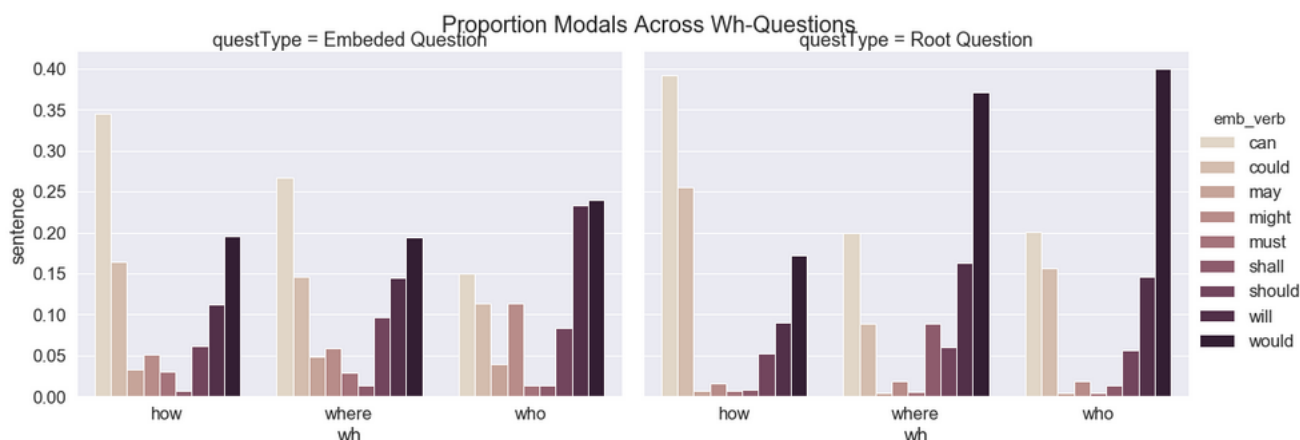


Figure E.10: Distribution of all modal auxiliaries across WH and QUESTTYPE.

#### E.3.1 Modal how-questions

##### (232) could

- a. Seem to be expressing disbelief or frustration How could we ever have believed otherwise? (#25971)  
How could she have written such stuff? (#37692)  
How could it be? (#71320)  
How could I know? (#72086)  
How the fuck could she know anything with Jesus and Donald Duck taped to the side of her fridge and her brain blended to mush by all that TV? (#181054)
- b. whyyyy How could she have drowned? (#109166)  
How could he have fled the country without any money? (#46218)  
How could this be happening to him? (#161363)  
How could you be such a damn stupid fool? (#267457)  
How could I be jealous of you? (#359800)

##### (233) will/would

- a. How long will it be? (#143251)  
How will you know? (#69872)  
How will you be paying? (#18840)  
How will the costs of the electricity and air-conditioning be recovered? (#280724)
- b. How would she know? (#198203)  
How would you get to the station? (#220162)  
How much would she have? (#267301)  
How many would that be? (#352945)  
How would that be? (#20879)

##### (234) should/shall

- a. How should I know? (#18752)  
How long should it be? (#107036)  
How should they be analysed? (#260151)
- b. How shall we know our own boots again? (#10303)  
How far shall important decision-making be decentralised? (#354937)

(235) **might/must/may**

- a. How might this be achieved? (#291414)  
How might your life be different if you expressed these seven qualities? (#248845)  
How much might that experience have twisted her within? (#151466)  
How might agriculture be affected? (#70751)
- b. How must she be feeling? (#113701)  
How many more must be sacrificed before something sensible is done? (#225750)  
How many must have walked here before him? (#236430)
- c. How many rows and columns of characters may be displayed on the screen? (#43294)  
How may they be improved? (#82994)

(236) **could**

- a. But I still don't see how he could have done it. (#251346)  
I wonder how anybody could ever go to gyms. (#194220)  
Don't know how you could drink it! (#225071)

(237) **would/will**

- a. I began to wonder how many of them would buy Tremayne's book. (#71253)  
She didn't know how he would do it but she felt sure he would. (#64649)  
I thought how Kaptan would have loved Arsenio. (#40565)  
I don't see how you would learn very much. (#44339)  
I knew how it would be. (#313430)
- b. I don't know how long it will take us to walk (#420224)  
I do not know how long that will last. (#5665)  
It remains to be seen how this will operate in practice. (#47600)  
That is how it will be written in the history books, Doctor. (#82506)  
I wonder how long he will be. (#194218)  
I also wonder how many Fairfaxes will be left in twenty years. (#281733)  
(#)

(238) **must/may/might**

- a. But I know how you must feel. (#12541)  
You can see how it must have looked. (#186086)  
I still wondered though, how it must feel to be a German. (#199779)
- b. This chart shows how a fact may be used in a variety of ways according to the historian's purpose. (#268022)  
Indeed, this is how our informants may see it. (#276406)

- c. But I can see how you might think you could gain an advantage (#111463)  
No one knows how sound waves might disturb a developing foetus or embryo (#2188)  
Yes, I can see how that might be awkward. (#181118)

(239) **should/shall**

- a. The big benefit would be to show how robot dogs should walk more efficiently (#1995)  
This is how differential equations should be done. (#35956)  
She knew exactly how Constance should be dressed. (#120222)
- b. I don't know how I shall manage to look at the screen. (#37560)  
I don't know how we shall get them out (#269014)

### E.3.2 Modal where-questions

(240) **could**

- a. Where could they be? (#34775)  
Where could we go? (#22547)  
Where could he have been going? (#199242)

(241) **would/will**

- a. Where would you get that? (#21378)  
Where, where would that have been? (#66985)  
Where would you be? (#90498)  
Where would they be without Paul Oakenfold or E? (#143583)
- b. Where will I go for the scan? (#143583)  
Where will the fruit be? (#79447)

(242) **must/might**

- a. Where must we go? (#317805)
- b. Where might the scheme be centred? (#171570)
- c. **should/shall**

(243) **could**

- a. I'd love to know where I could get a manual. (#211656)  
I know where I could use those. (#291075)  
Of course this is where a mountain bike could come in handy (#139962)

(244) **would/will**

- a. She knew where it would lead her and she also knew it would bring grief. (#21749)  
He knew where his vote would go (#114130)  
That is where Britain would suffer even more. (#70364)  
Of course, that's where the old man would probably differ. (#107205)
- b. This is where our base will be. (#34876)  
What worries us most is where the takeout will come from, (#242280)

cos we don't know where the next one will be (#415202)

(245) **must/may/might**

- a. This is where the first problems may occur. (#106400)  
And that is where time-out may prove useful (#50326)
- b. It is, indeed, where philosophy must begin. (#59616)
- c. That's where he might have come across them. (#109110)  
Because we didn't know where in the brain any changes might occur (#105329)

(246) **should**

- a. Oh that's where you should go for your computer, look (#23922)  
Well you know where the coats should be. (#78831)  
That's where it should be. (#207944)

### E.3.3 Modal who-questions

(247) **could**

- Who could have done that? (#28688)
- Who could it be? (#119716)
- Who could she tell? (#45669)
- Who could tell? (#209633)

(248) **would/will**

- a. WHO would have thought that those Spandau Ballet boys would have turned out to be such fine thespians? (#27980)  
Who would have thought it? (#28948)  
Who wouldn't be? (#164675)  
WHO in his right mind would want an American bank anyway? (#174517)  
who would be that cruel? (#393204)
- b. seems like only one person? Who will be the final arbiter? (#223782)  
Who will be doing the interview? (#150540)  
Who will these suckers be? (#209926)

(249) **must/may/might**

- a. Who then might this victim be? (#251676)

(250) **should/shall**

- a. Who should be involved in treatment sessions? (#87590)
- b. Who shall we have over for dinner? (#317790)

(251) **could**

- a. They competed to see who could eat most in the hotel restaurant. (#28623)  
Yeah, I don't know who I could ask though really, Joe Bloggs up the street. (#158943)

(252) **would/will**

- a. I wondered who would forgive Goreng. (#40581s)  
I know who the lads would rather listen to. (#292801)  
She wondered who would buy this house. (#111592)
- b. You know who it will be?. (#59948)  
He will decide who else will be employed. (#245090)  
It's not yet known who will take up his position in Gloucestershire. (#302515)  
The only problem is who will hold that covering position? (#216789)

(253) **must/may/might**

- a. I know who it must have been. (#27835)  
Lisa knew who it must be. (#308988)
- b. You never knew who might be listening. (#199255)  
You never know who else might come in. (#29395)
- c. 106411 Again, you do not know who may be listening. (#)

(254) **should/shall**

- a. Many experiments were done to decide who should have responsibility for controlling the sound (#16566)  
The potentially most divisive argument will be about who should be in charge during the dangerous period ahead. (#148484)

## ROOT QUESTIONS

(255) **Root How-Questions**

- a. **Rhetorical?**  
How can they get away with saying such things? (#13979)  
How can my Mum have dreadlocks on her eyebrows? (#15902)  
How then, can a plant have evolved beauty? (#25847)  
How can it have eyes? (#138583)  
How can you know something like this? (#96525)
- b. **Concrete? or practical?**  
How can they get to Maggon quickly? (#145795)  
How can you have free ice cream? (#377080)

(256) **Root Where-Questions**

- a. Where can I find it? (#27695)
- b. Where can I put this? (#32050)
- c. Where can we get sprouts from? (#379582)
- d. Where can I find metal? (#324691)

(257) **Root Who-Questions**

- a. Who can say? (#82102)
- b. Who can tell me? (#160158)
- c. Who can honestly say that Essex man was completely misguided? (#41424)

## EMBEDDED QUESTIONS

I will focus on giving examples of know.

### (258) Embedded How-questions

#### a. know

But you know how unreliable these estimates can be. (#34255)

You know just how stubborn the Colonel can be when he wants to get his own way. (#46159)

I know how difficult Pickles can be when she doesn't get her own way. (#117944)

I simply can't see how people can eat tripe (#319968)

I just don't know how anyone can do this to anyone else. (#97083)

I don't know how you can be so tired when you only get up at half past ten in the morning! (#196827)

#### b. Others

I often wonder how a person can get a degree in sociology. (#46101)

### (259) Embedded Where-Questions

a. D'you know where we can find Tamsin? (#270028)

b. I know where you can get a new keyboard. (#122458)

c. Think I know where we can hang it. (#155980)

d. And he wants to know where he can buy them in Ipswich. (#251890)

### (260) Embedded Who-Questions

a. It's not knowing who I can be assertive with. (#250976)

b. I do not know who I can get to write for me. (#310971)

c. Oh I don't know who that can be. (#396564)

## E.4 Results: NON-FINITE CLAUSE TYPE

### E.4.1 How-Questions

#### Non-Finite How-questions

The most frequent embedded verbs for how-questions are presented in Figure E.21.

In all cases, the most frequent matrix verb is know, occurring at least 2x the frequency of the second most frequent verb. The second most frequent matrix verb was learn, except in the case of get, where be was the second most frequent matrix verb.

Example sentences are provided below.



- (261) **do** (209)
- a. **Vague**  
I learned how to do everything. (#12075)  
Ada Gaily had known how to do things all her life. (#161516)  
'We Sards know how to do a great many things.' (#245352)
  - b. **Concrete**  
I don't know how to do it (#12438)  
yeah I know how to do it (#376533)  
he's learning how to do it (#378113)  
'Yes, I know how to do housekeeping,' she says with a touch of irony. (#205715)  
Yet few guidelines concerning how best to do this presently exist. (#93695)
- (262) **make** (131)
- a. **More concrete**  
do you know how to make gravy? (#391619)  
I know how to make a Spanish omelette (#379230)  
I learnt how to make shoes out of brown paper. (#231316)  
Do you know how to make a fire with the peats? (#371378)  
he'll have to learn how to make them himself (#389404)
  - b. **Less concrete**  
You just know how to make me feel special, don't you? (#29253)  
Such people knew how to make the watery wilderness yield up its riches. (#67790)  
You learn how to make do, it's surprising. (#161651)  
And the one that knows how to make time fly. (#363619)
- (263) **use** (130)
- a. **Concrete**  
I learned how to use the single needle telegraph instrument. (#229903)  
don't think I even know how to use an abacus (#399823)  
We had better learn how to use it well. (#223890)  
I don't know how to use the tape (#365266)
- (264) **get** (112)
- a. **Locations**  
yeah I know how to get to the motorway (#407151)  
He wants to know how to get up the steps to the left of the infrared detonator. (#98876)  
My next problem was how to get back to the hotel before my stomach gave a repeat performance. (#106297)  
'He will advise how best to get the package there.' (#133294)
  - b. **Achieving goals**  
Find out how to get promoted at work. (#150072)  
Even a loser like Dennis would know how to get word around. (#58366)  
"You've always known how to get rid of my friends," (#76558)  
Obviously she knew how to get through to him, and that was a good thing. (#16540)

In general, most sentences clearly convey some kind of optimality or "bestness", an

ordering of answers. Further, one other common characteristic is that in many cases the question's form actually contains indexical pronouns and other context-sensitive expressions. In some cases, questions were about concrete things in the world, as can be seen above (sentences labeled as "concrete"), while others were vague. In all cases, the most frequent matrix verb was know, occurring at least 2x the frequency of the second most frequent verb. The second most frequent matrix verb was learn, except in the case of get, where be was the second most frequent matrix verb.

## E.4.2 Where-Questions

### Non-Finite Where-questions

The most frequent embedded verbs for where-questions are presented in Figure E.24.

In all cases, the most frequent matrix verb is know. In three cases (find, look, and start), there was no other matrix verb occurring more than once (respective occurrences of know: 33, 34, 24). For GO, the second most frequent matrix verb was decide (7), and for be it was 's (3).

The Example sentences are below.

(265) **go** (58)

a. **Moved objects**

Well he didn't know where to go or what happened. (#15892)

I couldn't remember where to go. (#60724)

I didn't know where to go. (#292926)

By then we'll know where to go (#220671)

b. **With some kind of object**

well I know where to go from here (#402940)

Now we need to decide where to go from here. (#312233)

so yes I know where to go in (#376703)

The smart operator knows where to go to get information. (#187564)

The problem for the travellers now is where to go next. (#142732)

(266) **look** (37)

a. **No object specified**

And Holly knew where to look. (#294080)

Downstairs, she did not know where to look. (#310992)

b. **Contextual anaphora**

'Well, if Mr Multhrop's teaspoons or Mrs Figgis-Hewett's jewellery vanishes, we'll know where to look.' (#251249)

He had known where to look for it when he'd left the bell tower after finding her corpse. (#112538)

c. **Cues in the rest of the sentence (including anaphora)**

Thieves instinctively know where to look. (#65721)

Neither Ellie nor Patsy knew where to look, because the woman was still in her dressing gown. (#313290)

Yet behind the grubby façades, if you know where to look, you can still find the Unani doctors, practising in exactly the way they always have. (#135340)

There's ultimate emptiness all around us, if only you know where to look. (#222007)

There's a Roman road there, and some firm ground if you know where to look. (#195712)

d. **Explicit objects**

But with a few well-chosen books you can know where to look for the information you need. (#318149)

Don't know where to look for help (#150179)

(267) **find** (35)

a. **Explicit objects**

You would know where to find the place, I suppose? (#49068)

So now I know where to find the rest of the Unit's papers. (#56657)

But at least he knew where to find electricity. (#96577)

b. **Pronouns**

we know where to find you. (#112429)

To share with others, you need to know where to find them. (#348603)

And he didn't know where to find her to let her know (#356313)

Well he knows where to find me. (#66711)

(268) **start** (32)

a. **No explicit object (majority of cases)**

I don't know where to start. (#24305)

Unfortunately there are so many parameters available that I don't know where to start! (#206682)

Deciding where to start (#143081)

I was just wondering where to start. (#147829)

b. **Explicit Objects**

Suppose you have to choose where to start a new factory for the 'Easishop' carrier. (#303209)

To help you find out where to start reading. (#348692)

I just don't know where to start looking. (#364332)

yeah I wouldn't even know where to start on anything like that (#387986)

(269) **put** (29)

- a. I didn't know where to put myself when he said that. (#322316)  
I didn't know where else to put him. (#114046)  
Bill does not seem to know where to put his hands. (#222004)
- b. I can never decide where to put the baubles I get too stressed out (#408778)  
You must also consider where to put heaters and radiators (#128332)

### E.4.3 Who-Questions

The most frequent embedded verbs for who-questions are presented in Figure E.27.

The overall most frequent matrix verbs here are know and find, where know comes in first except for when combined with go.

Example sentences are provided below.

#### (270) **contact** (6)

##### a. **Explicit Object**

Write to the addresses below to find out who to contact in your country. (#249902)

Relatives also need to know who to contact and how when an emergency arises. (#17906)

Because we know who to contact and where to contact them, we can often save the producer a lot of time, trouble and even money. (#95946)

##### b. **WH-moved object**

As for the York Whites, I would not even know who to contact, sorry. (#272159)

Over the next few months we planned when to go, who to take, who to contact and why. (#99147)

#### (271) **turn** (6)

- a. I didn't know who to turn to and I felt really desperate (#47896)

#### (272) **go** (3)

- a. To find out who to ring and where to go for items featured here, see our Shopping Director on page 132 (# 49637)

I know who to go to. (#114173)

He knows who to go to for explanations. (#131743)

#### (273) **believe** (3)

- a. I did not know who to believe. (#291666)

#### (274) **talk** (3)

- a. Well we know who to talk to don't we? (#299085)

## E.5 Results: verbs in FINITE CLAUSETYPE

In order to understand what contribution CLAUSETYPE is making to the meaning conveyed by the question, we will look at what verbs (coded as EMB\_\_VERB) are occurring within the question, for each wh-question type. We will look at how-questions, then where-questions, and finally who-questions.

I will briefly summarize the results to come. The most frequent verbs occurring with questions are the auxiliaries like *be*/, *'s*, *do*, *have*, *get*, *go*.<sup>1</sup> In root questions, it is especially unsurprising to see these verbs frequently because they are the ones which can undergo subject-auxiliary movement, a hallmark feature of root questions in English. Since they often occur as auxiliaries to other main verbs, we can look at the distribution of second verbs in the question, which might prove more informative for making generalizations about the semantic content of these different questions. This was coded in the dataset as 'v2\_\_after' (i.e., the second verb after the wh-word).

### E.5.1 How-Questions

How-questions have formed the traditional basis for arguments for semantic non-exhaustivity (cf. Hintikka 1976; Asher & Lascarides (1998), Beck & Rullmann 1999).

Overall, the most frequent verbs occurring in how-questions are *be* (23%, 10219), *do* (19%, 8210), *can* (7%, 3089), and *have* (6%, 2806). This isn't particularly revealing about why how-questions should be interpreted non-exhaustively. Over the next several pages we look more closely at each CLAUSETYPE, the more fine-grained distributions of verbs, and some examples of common how-questions.

In FINITE how-questions, the four most frequent verbs are the same across root and embedded questions, but in slightly different orders. Figure E.30 presents this graphically.

We find the following distributions in Figure E.31.

---

<sup>1</sup>I have kept occurrences of the *'s* contraction coded as *'s* rather than as an uncontracted verb because both *be* and *has* have been contracted as *'s*. While the latter contraction is much less common, it appeared common enough during initial phases of writing the parsing script to warrant not deciding ahead of time which verb to code it as.

Note that the lightest colored bar represents the cases where there was no second verb. We can see that this was the case the majority of the time overall, for most first verbs. Exceptions include in EMBEDDED QUESTIONS have which was most frequently followed by been as in have been; and in ROOT QUESTIONS do which was most frequently followed by know, and have which was again most frequently followed by been.

Let's take a look at some examples of ROOT QUESTIONS. Many of the questions we see here are the kind you ask when making small talk. The bulk of these kind of questions account for the high frequency of the verbs be/'s, and have.

**(275) (Polite) Conversational Questions**

- a. How do you do, Constable? (#84336)
- b. How are you? (#11416)
- c. How's it going? (#248304)
- d. How have you been? (#413810)
- e. How much is that? (#11517)
- f. How's the hand? (# 224277)
- g. How long has it been? (#264709)

These kinds of questions don't quite translate into embedded form, in a moment we will look at embedded questions.

Some questions are quite specific and well-defined.

**(276) Specific Questions**

- a. How the hell did you get here? (#88108)
- b. How long have people been making pastry for? (#251921)
- c. How long have these fire festivals been going on? (#91599)
- d. How has the cat been used in warfare? (#181893)
- e. How far have woodland owners' decisions been influenced by these measures? (#93765)

(276a)-(276c) seem to have only one answer. (276a) nicely evokes an answer like, I took the bus, while (276b) and (276c) something like For over 300 years. Note that even here we can imagine answers differing in their granularity: answering a how long question could be done with an exact or inexact time period (for exactly 329 years vs. for over 300 years, or since the 18th century), or with something like since the discovery of flour

which doesn't specify a time quantity in the answer. (276d) and (276e) are like essay questions. There might be a list of answers to give, but it seems that discussion of one main factor, might also be permissible.

There are a number of other kind of FINITE how-questions. There are those which seem to convey a goal, or at least suggest that the questioner has some (hidden) intention.

(277) **Goal-oriented questions**

- a. How safe is it? (#1909)
- b. How do I get there? (#76644)
- c. How do you get the lifts to work? (#98916)
- d. How do you get them to flower so enthusiastically? (#102120)
- e. How do you do that? (#75067)

For example, (277a) suggests a discourse where the speaker wants to go somewhere or try something unknown and is ascertaining whether it's a good idea. The asker of (277b) wants to go there but doesn't know the way.

The questions in 278 seem to require context to make heads or tails of what possible answers might be

(278) **Underspecified Questions**

- a. How do you know? (#97642)/How do you know this? (#74784)
- b. How have you been justifying your existence in the last twenty-four hour? (#90841)

As for embedded questions, we find that amongst these most frequent first verbs, more often than not there is no second verb. The exception is have, which is most often followed by been. Before looking through examples, we can also take a look at matrix verbs. Figure E.32 plots the most frequent embedded (first) verbs by the most frequent matrix verbs.

The most frequent matrix verbs are know, see, be, say.

The most frequent combinations of matrix and embedded verbs are know\_how\_be (275), know\_how\_'s (196), see\_how\_be (110), 's\_how\_'s (107), be\_how\_be (92), say\_how\_be (64).

(279) **know**

- a. **know\_how\_be** (275)
  - You know how it is with volunteers, Pascoe. (#16076)
  - Do you know how far it is to my house from here? (#38437)
  - We both know how it was (#58765)
- b. **know\_how\_'s** (196)
  - They don't know how it's gonna work. (#29281)
  - Want to know how the stockmarket's doing? (#29623)
- (280) **see**
  - a. **see\_how\_be** (110)
    - I must see how Mummy is. (#7313)
    - Owen was surprised to see how extensive the list was. (#166077)
  - b. **see\_how\_go** (71) Well we'll see how we go. (#11593)
- (281) **'s**
  - a. **'s\_how\_be** (107)
    - Er and that's how it is today. (#335336)
    - That's how brilliant he was. (#350524)
  - b. **'s\_how\_'s** (72)
    - That's how it goes. (#254846)
  - c. **'s\_how\_get** (38)
    - that's how we got them mugs (#401481)
  - d. **'s\_how\_do** (29)
    - and that's how they do it? (#313180)
  - e. **'s\_how\_go** (19)
    - That's how it goes. (#254846)
- (282) **be**
  - a. **be\_how\_be** (92)
    - That was how she was. (#79191)
    - Most provocative of all is how unprovocative are the slogans. (#28121)
- (283) **say**
  - a. **say\_how\_be** (92) Have they said how much the delivery charge is? (#143175)
    - They keep saying how cheap everything is (#219514)

## E.5.2 Where-questions

The most frequent verbs in where-questions are presented in Figure [E.33](#). For both root and embedded questions, these most frequent constructions typically occur without



any other verb in the question (Root: about 69%, and Embedded: about 49%), but this differs for different first verbs. Figure E.34 presents the distribution of second verbs.

Some examples of common root questions are presented below. Most common second verbs include

- (284) a. Where did you go? (#21783)  
Where did you get the gun from? (#23176)
- b. So where does philosophy belong? (#23535)
- (285) **be/s**
  - a. Where was Richard Tonks? (#3359)  
Where is the evidence? (#6500)  
Where was he? (#22557)
  - b. Where's the blue? (#71755)  
Where's Aunt Susan? (#76867)  
Where's the cheese box? (#78789)  
Where's the Temple? (#89645)
- (286) **have**
  - a. where have they gone? (#400009)  
where have they come from? (#407919)  
Where had that question come from? (#145085)
- (287) **get**
  - a. So where's Rick got to? (#146054)  
Where you get off at? (#196635)
  - b. Where's Snoopy getting the money from to go to the Tiger's Head tonight? (#62595)  
Where d'ya get that? (#290995)

Figure E.35 presents the distribution of matrix verbs for the most frequent embedded verbs.

For embedded questions, they are most frequently complements to know (1597), be (1182), and 's (783). The next most frequent matrix verbs are wonder (177) and see (176). Let's look at some examples of these embedded questions.

- (288) **be** (4038)
  - a. **Matrix Verb: know** Sure I never know where that boy is. (#3702)  
Do you know where it is? (#33832)  
I don't know where it is. (#41315)  
He knew where he was going. (#45754)  
He knew where Caspar's collar was. (#63118)  
Check that your child knows where the loo is (#100700)

- b. **Matrix verb: be/'s** That's where you're wrong (#13975)  
 The site is where the zoo is. (#23967)  
 This is where Pakistan are scoring points and their youth policy has paid off. (#29323)  
 So that's where I was going wrong with Springsteen. (#93311)  
 A more straightforward example is where a technically inefficient process is being used. (#189502)
- c. **Matrix Verb: other** I can see where it is. (#7617)  
 I was looking to see where the cha children were? (#78888)  
 Oh I wondered where he was (#69350)  
 I didn't say where I was going Joanne. (#44347)  
 Now, let's see where we were. (#10624)  
 I wonder where the Labour party was while all these lessons were being learned. (#5819)
- (289) **'s**
- a. I don't know where it's coming from (#9782)  
 No, I wonder where she's put the dogs? (#21406)  
 I don't know where it's gone. (#69077)  
 I know where it's happened (#138384)
- (290) **have (1597)**
- a. Waikiki was where the bygone chiefs of Oahu had surfed. (#64595)  
 That was where his problems had started. (#140630)  
 He wondered where the boy had come from. (#144920)  
 God knows where Bunny had found them. (#344468)  
 She didn't know where the question had come from. (#299984)
- (291) **come**
- a. you know where your next meal's coming from (#420500)  
 I don't even know where they come from (#389698)  
 I wonder where it came from (#97321)  
 that's where the boxer came from (#399975)  
 and that's where the term come from (#390446)

### E.5.3 Who-Questions

The most frequent verbs in Finite who-questions are presented in Figure E.36.

The most common second verbs are plotted in Figure E.37.

Example root questions are presented below:

- (292) **'s**
- a. **Anaphoric/Plausibly with specific answers**  
 Who's this? (#11696)  
 Who's there? (#16817)

Who's that? (#23956)  
 Who's this guy? (#67877)  
 Who's that old tosser at the bar? (#82078)  
 Oh, who's the ginger hair then (#84638)  
 Who's got the red ones? (#24901)  
 Who's got the horrible children? (#105924)

(293) **be**

a. **Open-ended questions**

Who are you? (#138544)  
 Who is she? (#137320)  
 Who is it? (#155408)  
 Who are these hippies? (#189895)  
 Who am I? (#196034)  
 Who the hell was Danzig? (#267121)  
 Who is a refugee? (#270404) Who was responsible? (#148249)  
 Who is right? (#217967)

b. **Questions with specific answers**

Who are your customers? (#258521)  
 Who are you going to see in Tewkesbury? (#260663)  
 Who was the leader of the Labour Party before Harold Wilson? (#155873)  
 Who were the popular film stars in those days? (#170341)

(294) **do**

a. **Anaphoric**

who did? (#418745)  
 who doesn't? (#393567)  
 who did that? (#379485)  
 who does that? (#381686)  
 Who did the drawing? (#24326)

b. **Open-ended** Who does she think she is? (#302677)

Who do you think you are, Lady Merchiston? (#150750)

(295) **say**

a. **Anaphoric/Plausibly with specific answers**

Who said that? (#24416)  
 Who says so? (#119097)  
 Who said moustache? (#209428)  
 Who said no? (#265755)

b. **Rhetorical**

Who says self-same any more? (#123461)  
 Who says the age of irony is dead? (#62961)  
 Who says the age of miracles is dead? (#103538)

(296) **know, have, want**

a. **Anaphoric/Plausibly with specific answers**

Who has? (#220516)  
 who had the canary? (#409913)  
 Who wants a coffee? (#9637)

Who wants the custard? (#331721)  
 Who wants that? (#328135)  
 who has more bones a baby or an adult? (#404621)  
 Who knows China's deepest and greatest secret? (#115145)

b. **Open-ended/Rhetorical**

Who knows? (#207398)  
 Who knows what the truth really is? (#229171)  
 who wants a Big Mac at ha ten o'clock in the morning? (#376428)  
 Who wants that apart from a few wildly unrepresentative fanatics? (#328136)

It seems that generally, these root questions pattern as either open-ended or rhetorical, where it's unclear whether a real answer is elicited by the speaker from the addressee, or where the granularity of an answer is not straightforward; or as either anaphoric to the conversational/situational context, or where specific answers seem ready/available from the question's meaning. These two categories seem to be complementary in their distribution.

We can take a look at the most frequent matrix verbs for these most frequent embedded verbs. Figure E.38 present this distribution.

Example Embedded questions are provided below.

(297) **be**

- a. I'm dying to know who Charlie is. (#38098)  
 You don't know who he is. (#76593)  
 Can't remember who it is. (#106656)  
 Suddenly, the King realized who I was. (#107867)  
 He could guess who it was. (#114097)  
 He wondered who she was. (#114202)

(298) **'s**

- a. I wonder who's gonna wander in. (#293749)  
 I want to know who's going to win on this budget and who's going to lose. (#292288)  
 Then we'll see who's serious. (#181076)

(299) **do, mean**

- a. You know who did it. (#135191)  
 I know who you mean. (#121337)  
 did you find out who else got the money? (#409261)  
 You didn't ask who he got his information from. (#72046)  
 you know who has no sort of light at the end of the tunnel (#382025)  
 They were arguing about who had the softest fabric and I was called in as arbitrator. (#241443)

## E.6 Cue words across *wh*-type

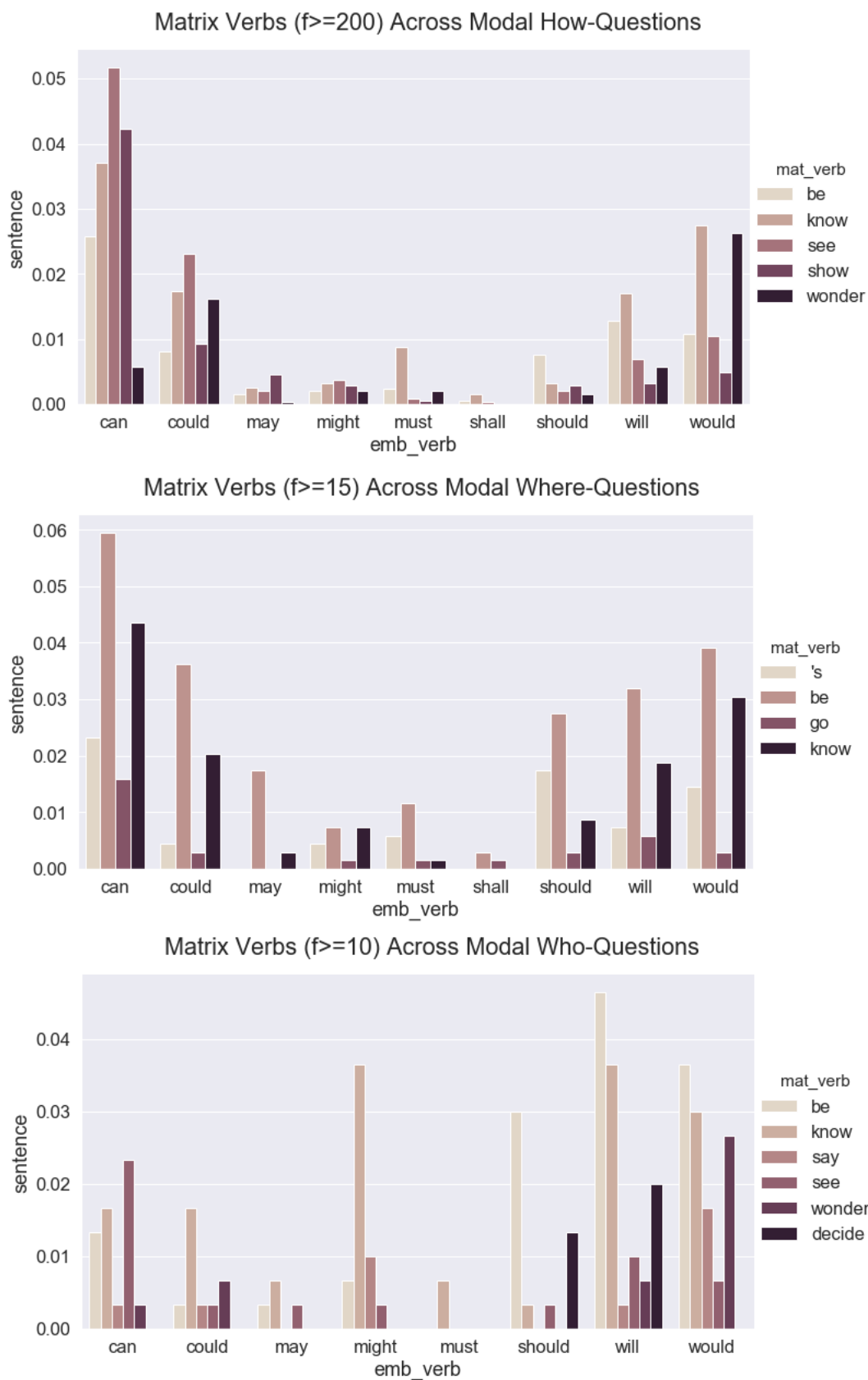
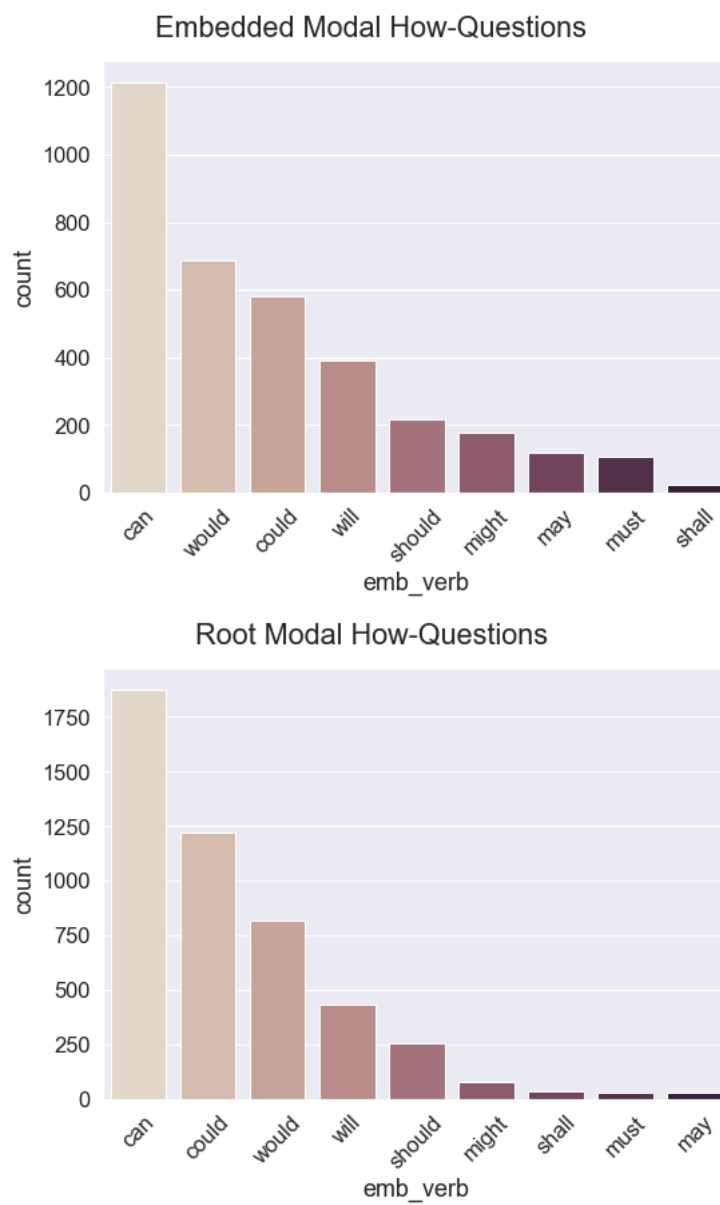
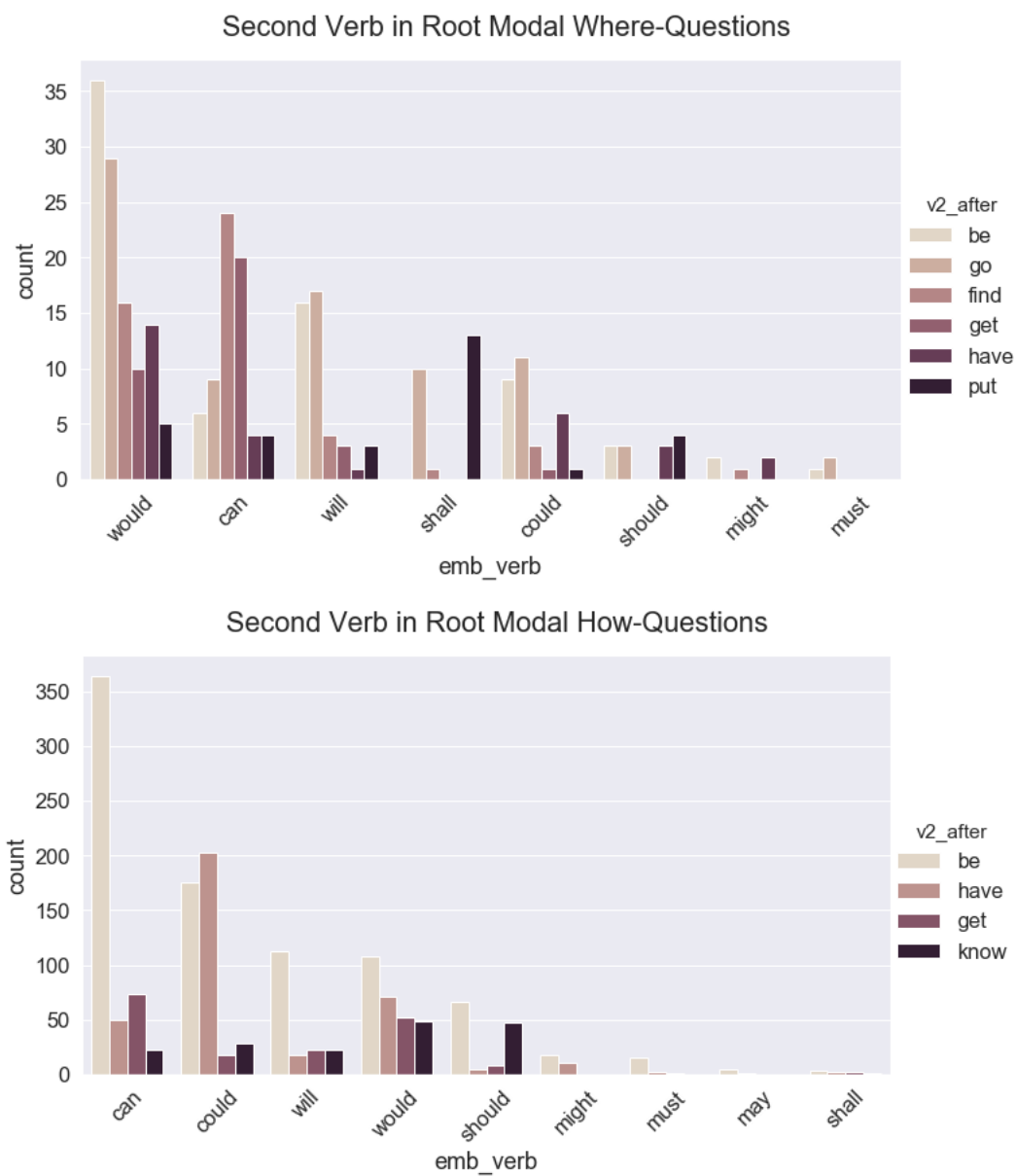


Figure E.11: Distribution of MATRIX VERBS across modal questions.

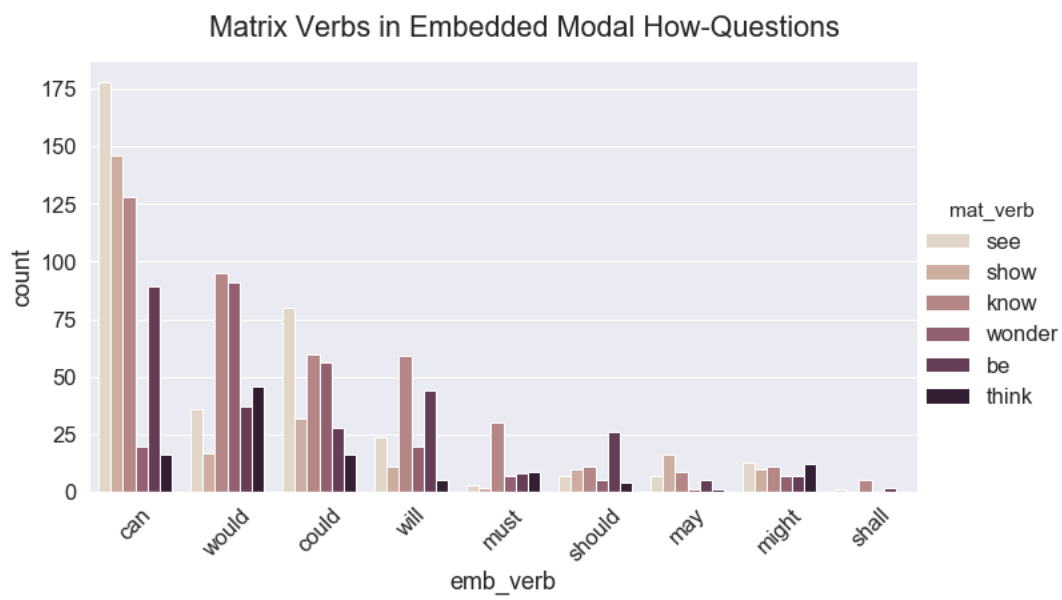


**Figure E.12:** Modals Finite Root and Embedded how-questions.

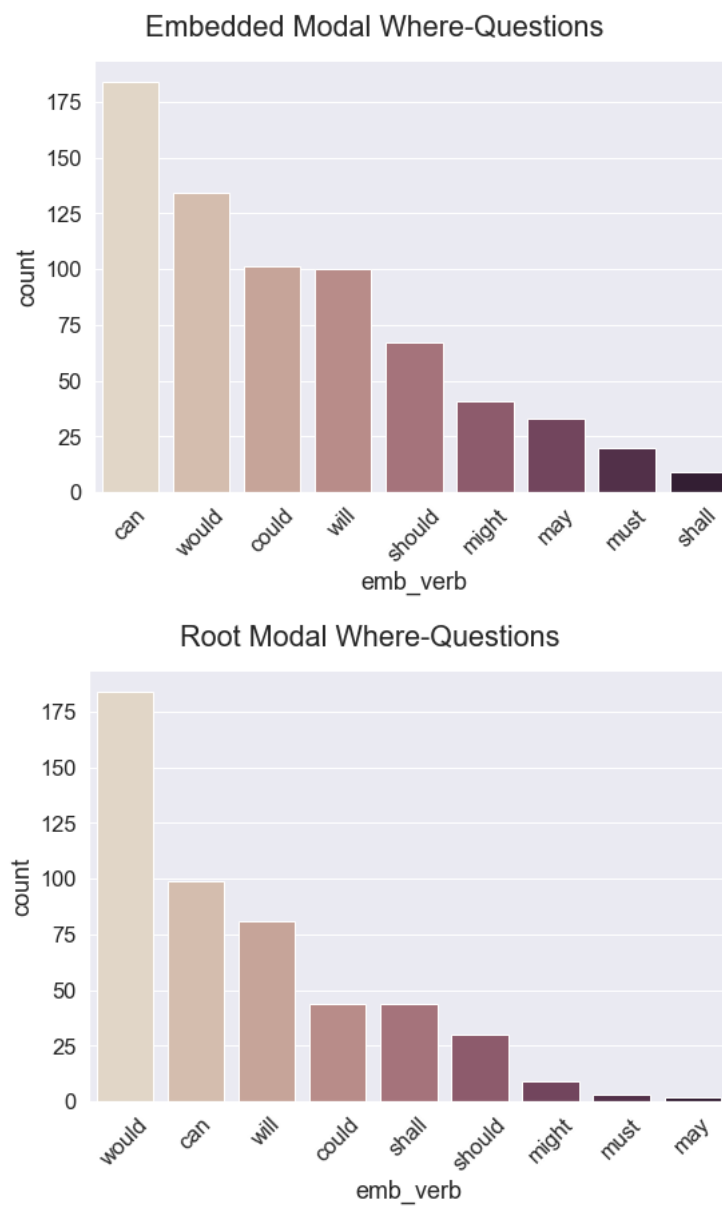


**Figure E.13:** Most frequent second verbs in Modal Root and Embedded how-questions.

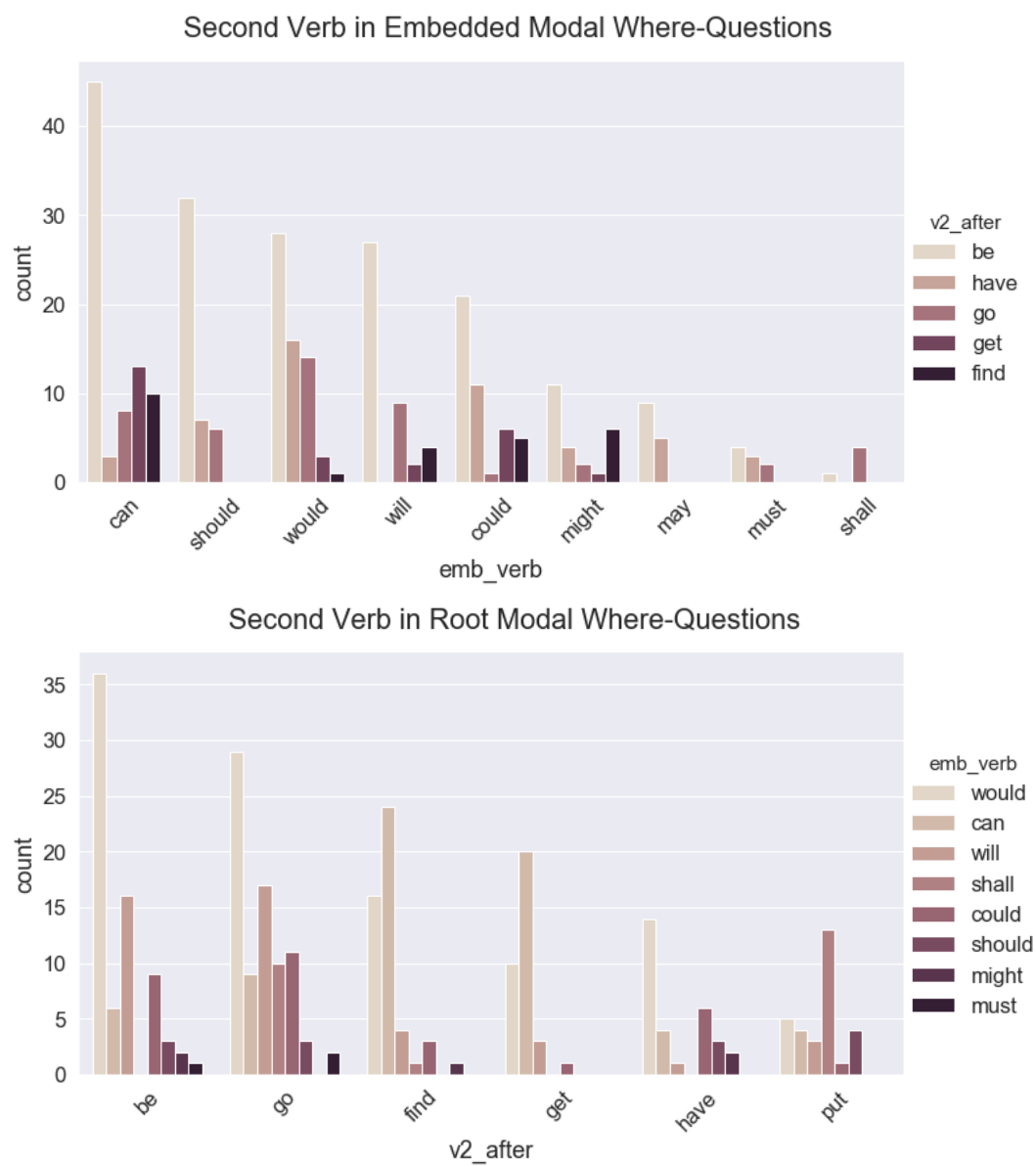




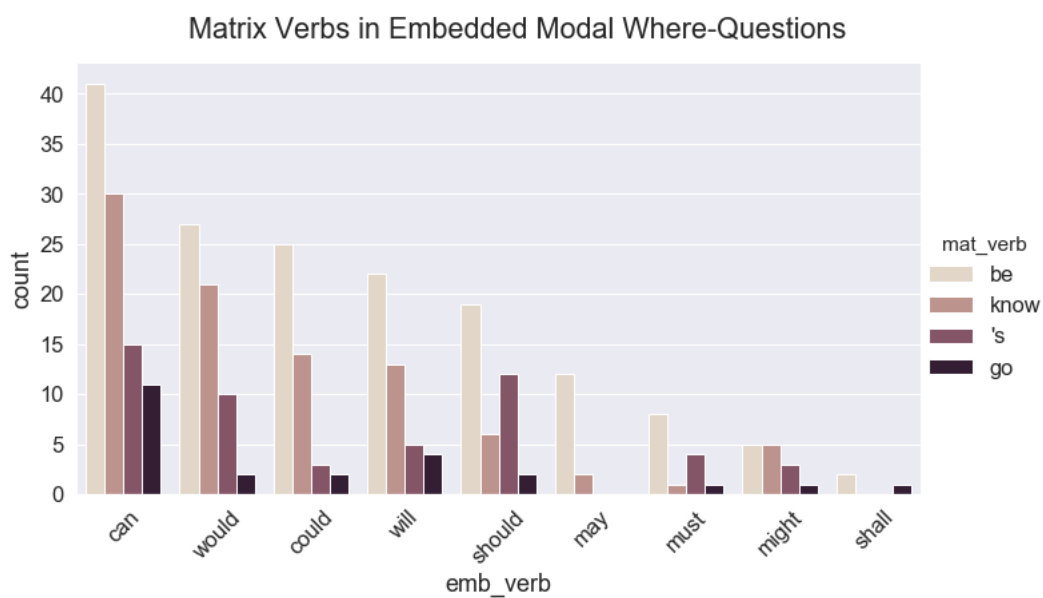
**Figure E.14:** Most frequent matrix verbs in Modal Embedded how-questions.



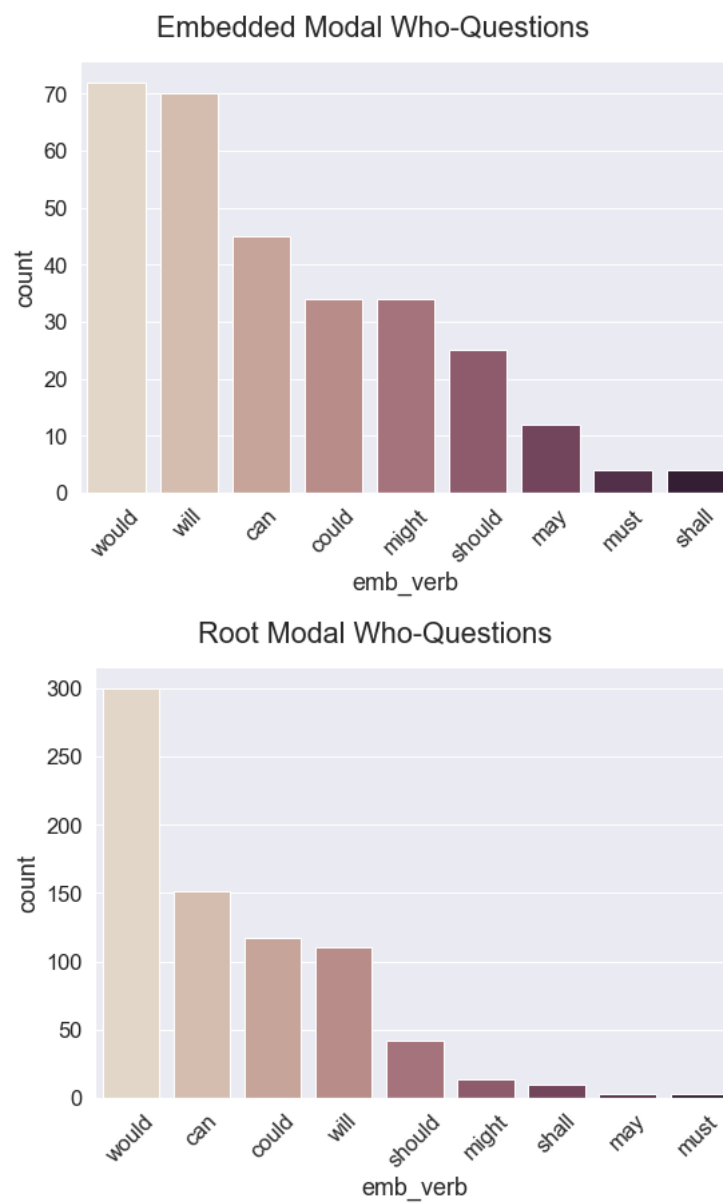
**Figure E.15:** Modals Finite Root and Embedded where-questions.



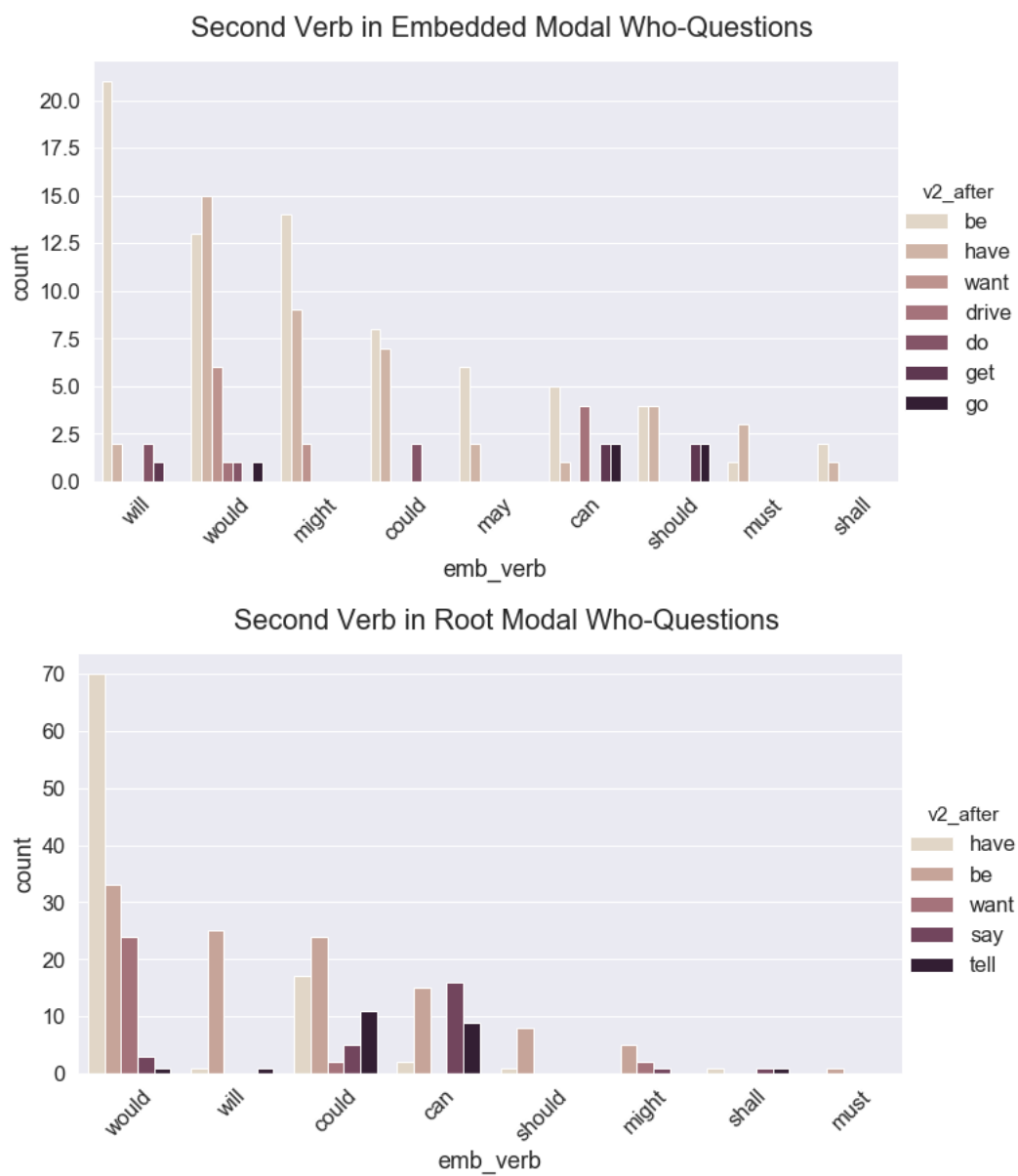
**Figure E.16:** Most frequent second verbs in Modal Root and Embedded where-questions.



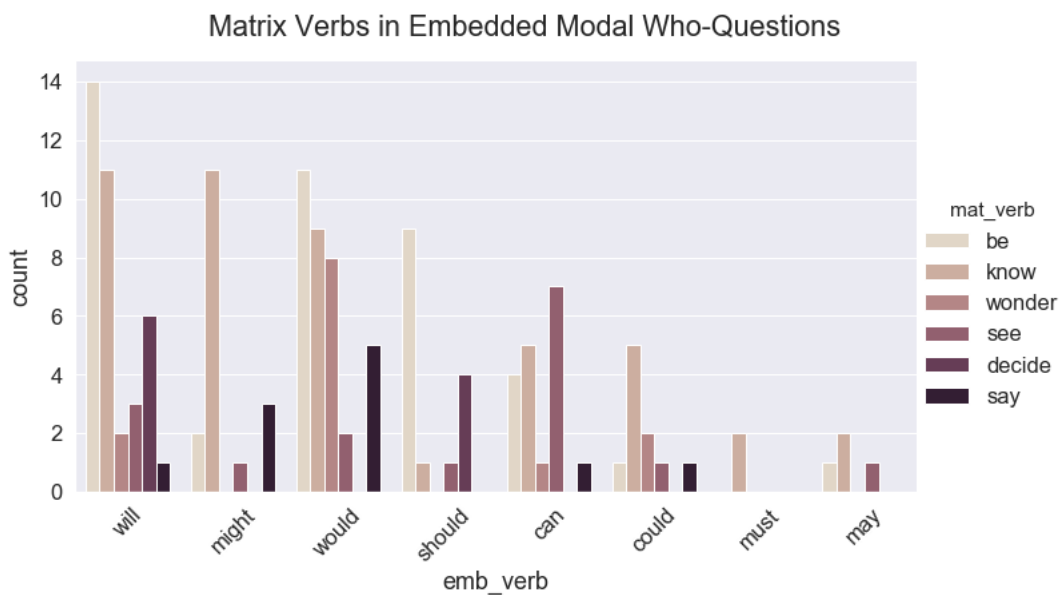
**Figure E.17:** Most frequent matrix verbs in Modal Embedded where-questions.



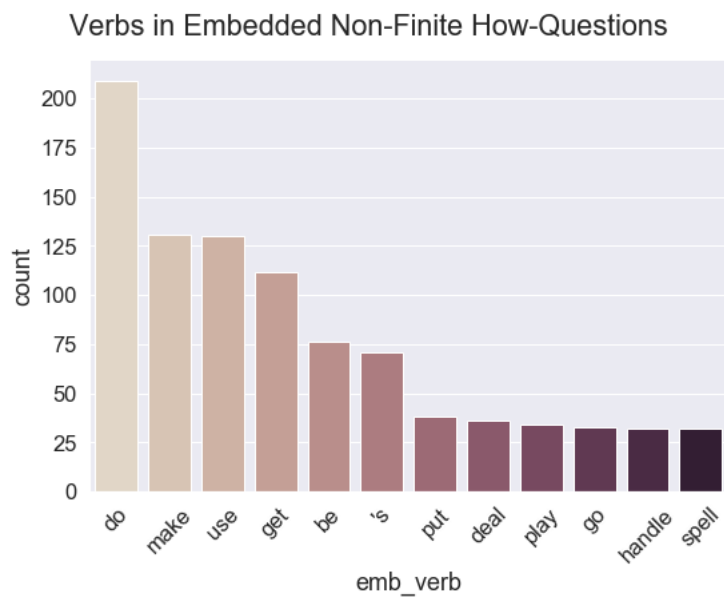
**Figure E.18:** Modals Finite Root and Embedded who-questions.



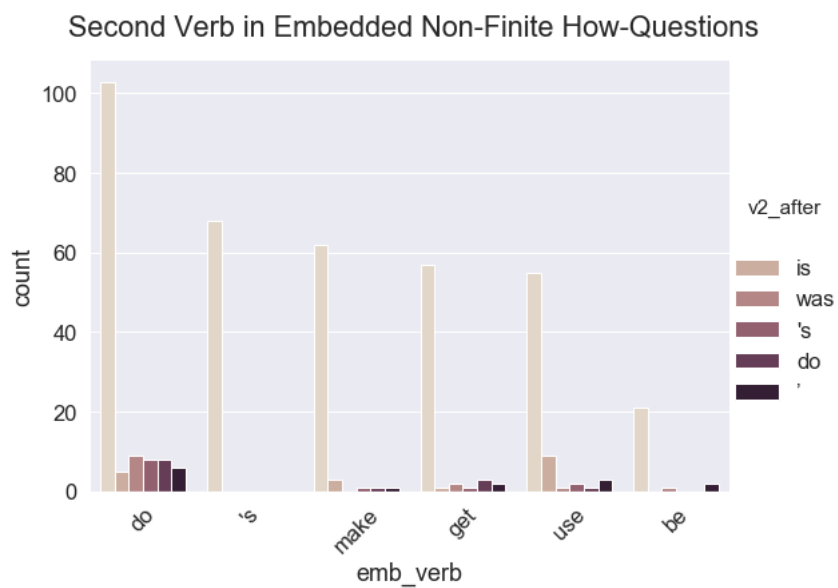
**Figure E.19:** Most frequent second verbs in Modal Root and Embedded who-questions.



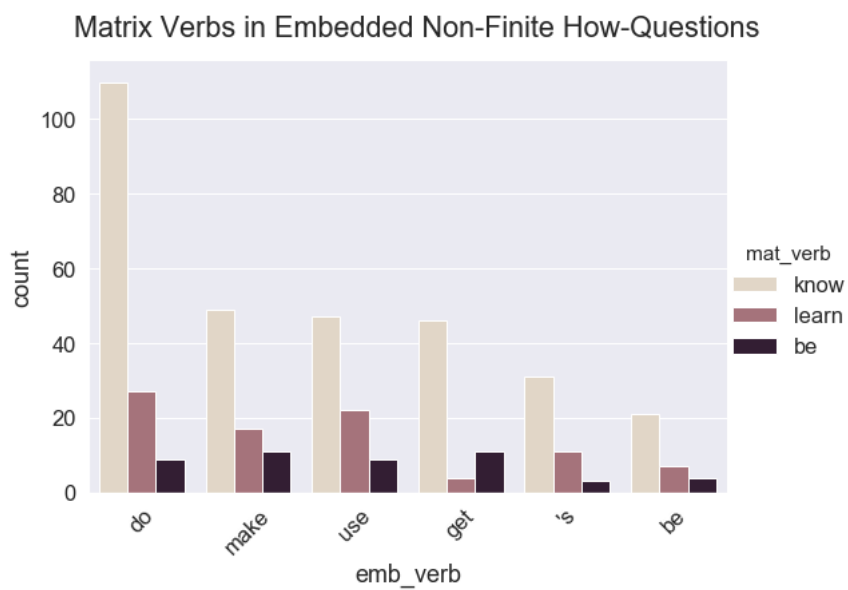
**Figure E.20:** Most frequent matrix verbs in Modal Embedded who-questions.



**Figure E.21:** Most frequent verbs in Non-Finite Embedded how-questions.

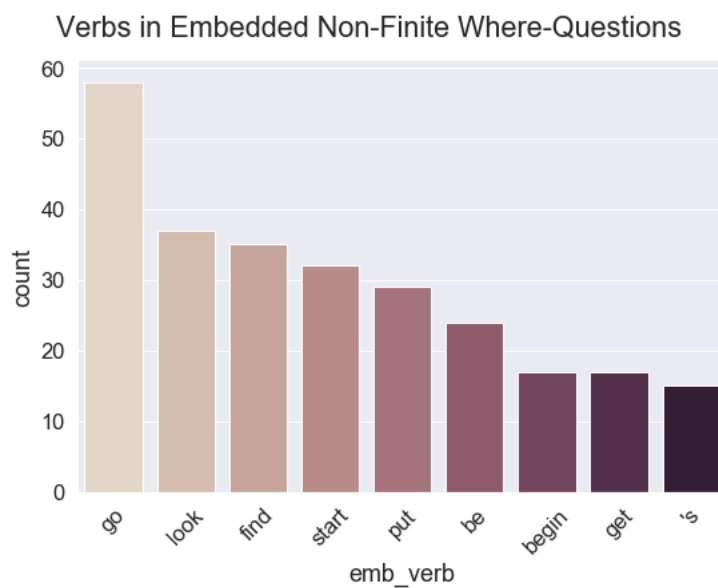


**Figure E.22:** Most frequent second verbs in Non-Finite Embedded how-questions.

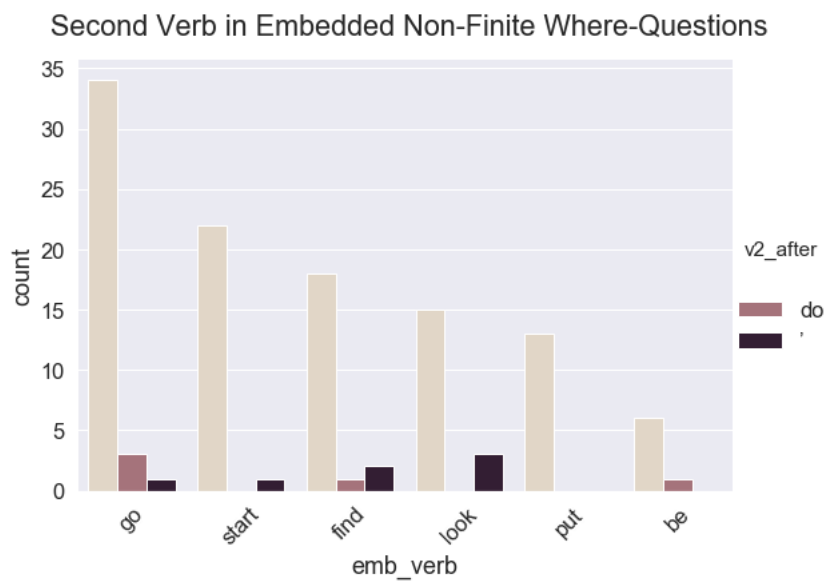


**Figure E.23:** Most frequent matrix verbs in Non-Finite Embedded how-questions.

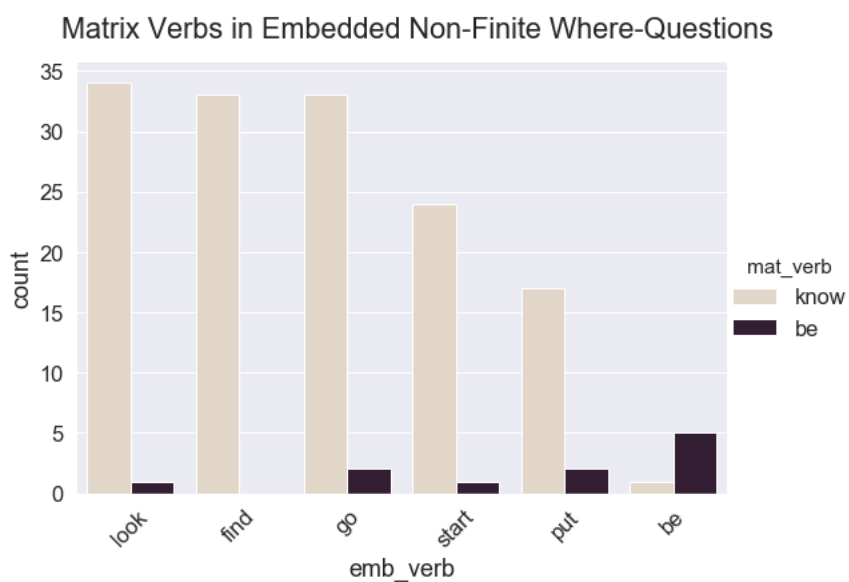




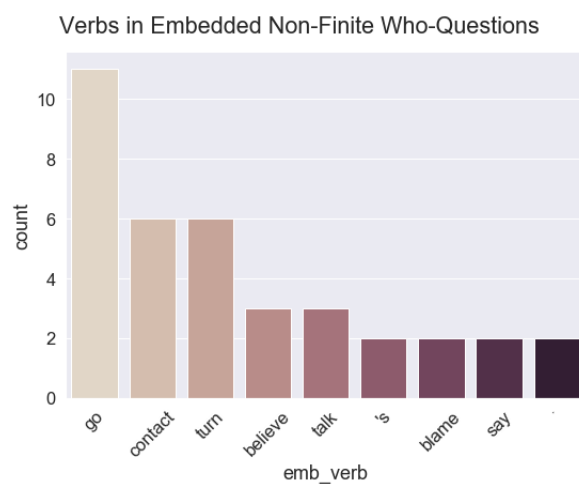
**Figure E.24:** Most frequent verbs in Non-Finite Embedded where-questions.



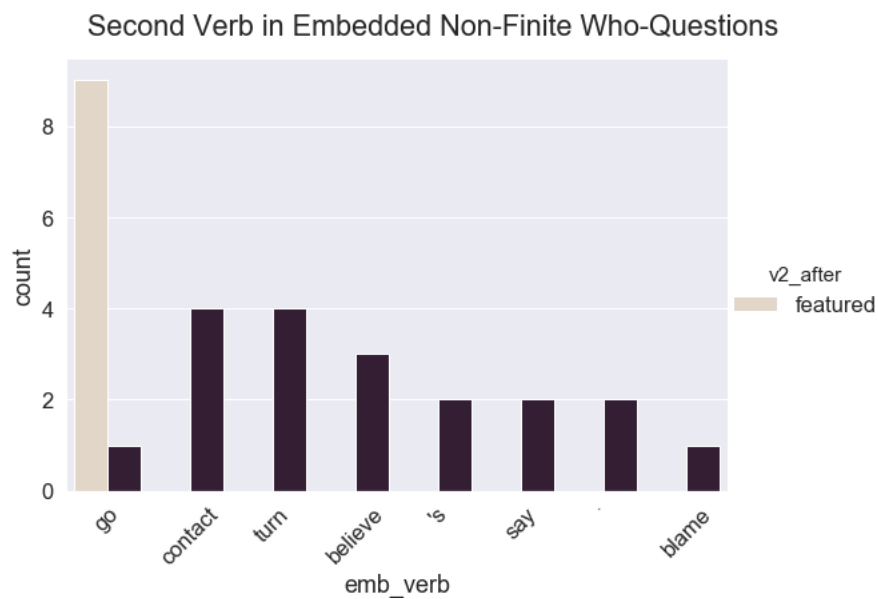
**Figure E.25:** Most frequent second verbs in Non-Finite Embedded where-questions.



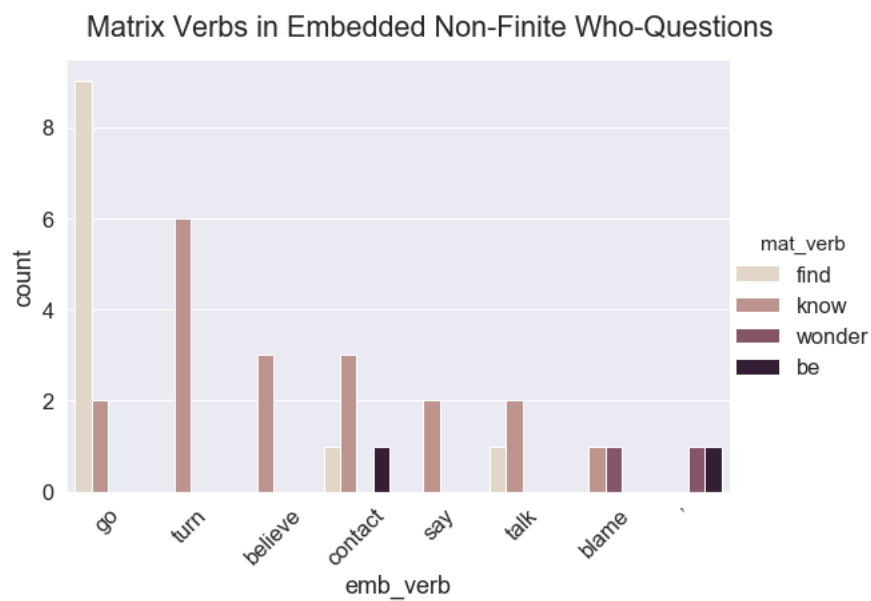
**Figure E.26:** Most frequent matrix verbs in Non-Finite Embedded where-questions.



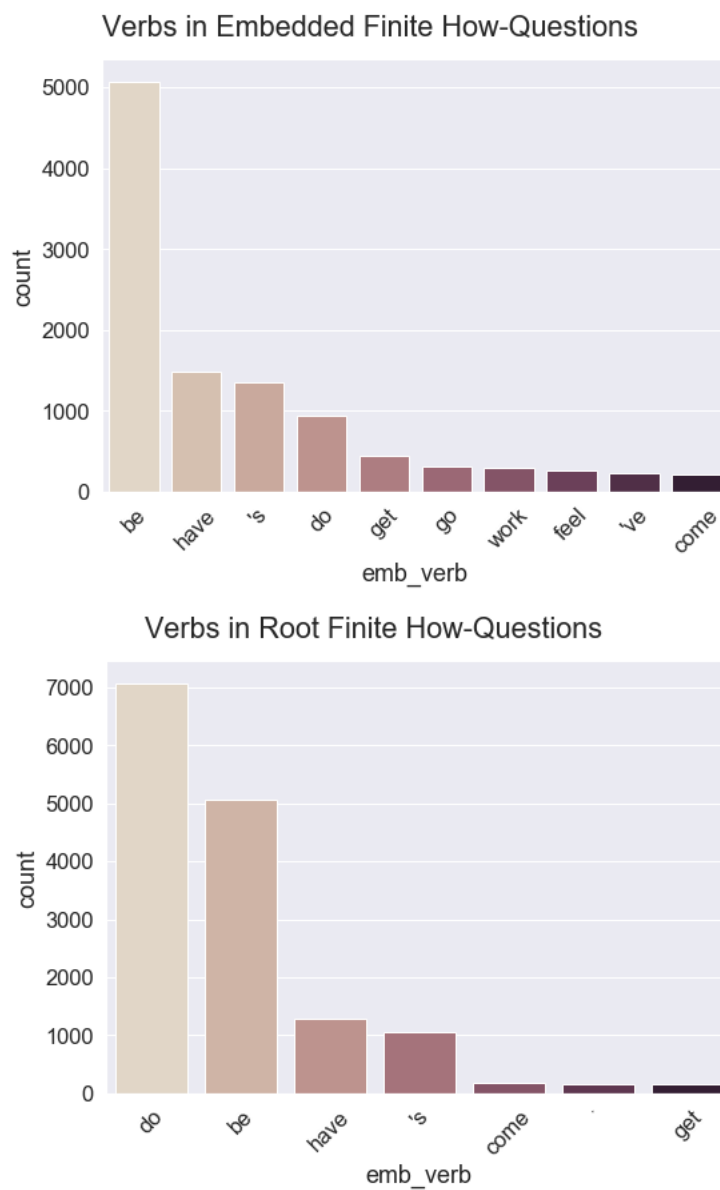
**Figure E.27:** Most frequent verbs in Non-Finite Embedded who-questions.



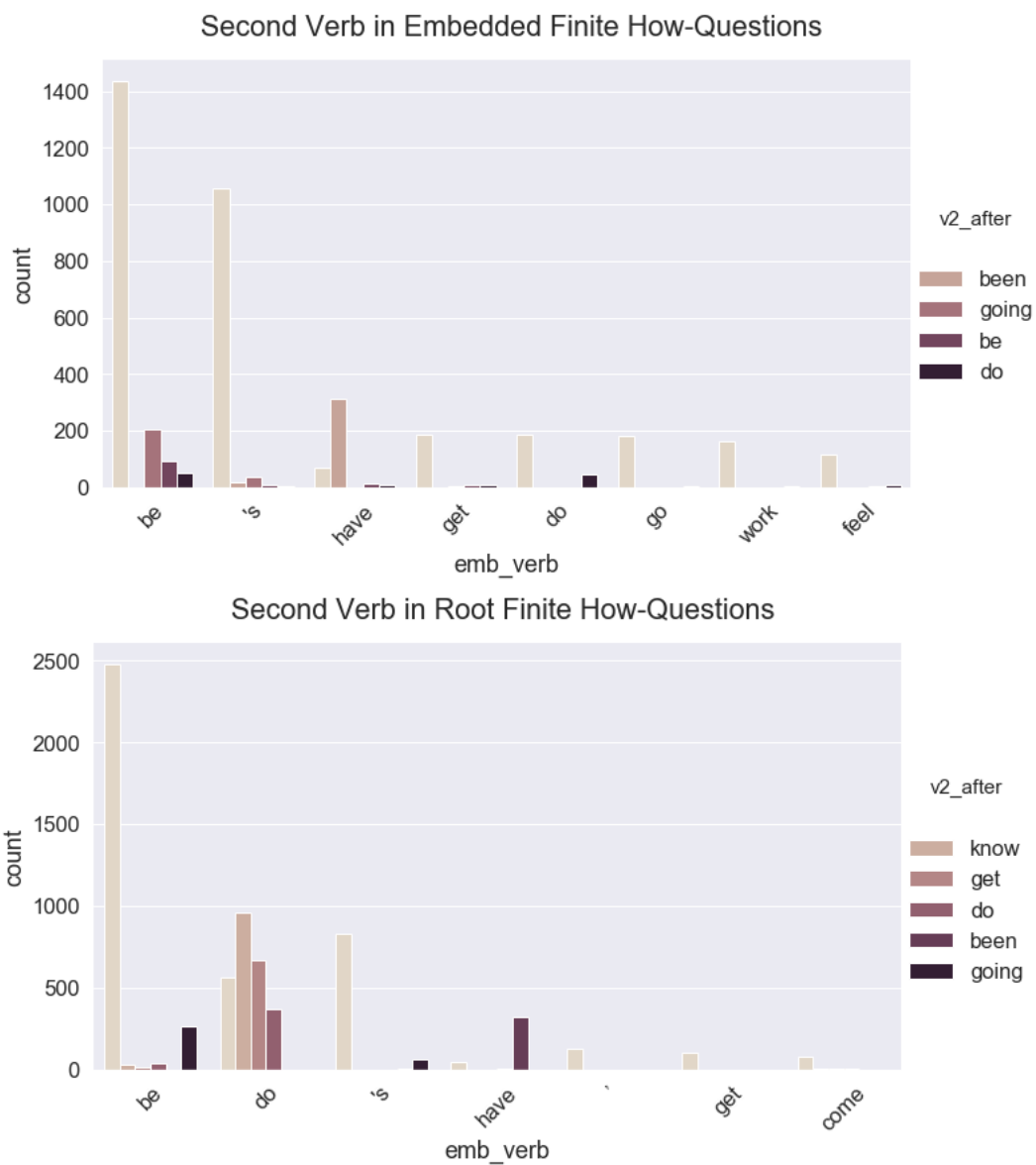
**Figure E.28:** Most frequent second verbs in Non-Finite Embedded who-questions.



**Figure E.29:** Most frequent matrix verbs in Non-Finite Embedded who-questions.



**Figure E.30:** Most frequent verbs in FINITE ROOT AND EMBEDDED how-questions.



**Figure E.31:** Most frequent second verb per first verb in FINITE ROOT AND EMBEDDED how-questions.

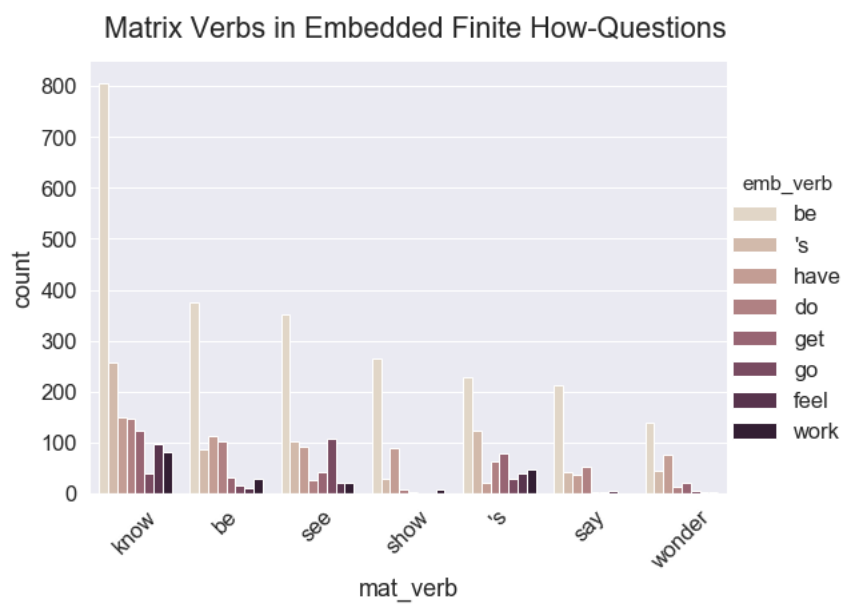
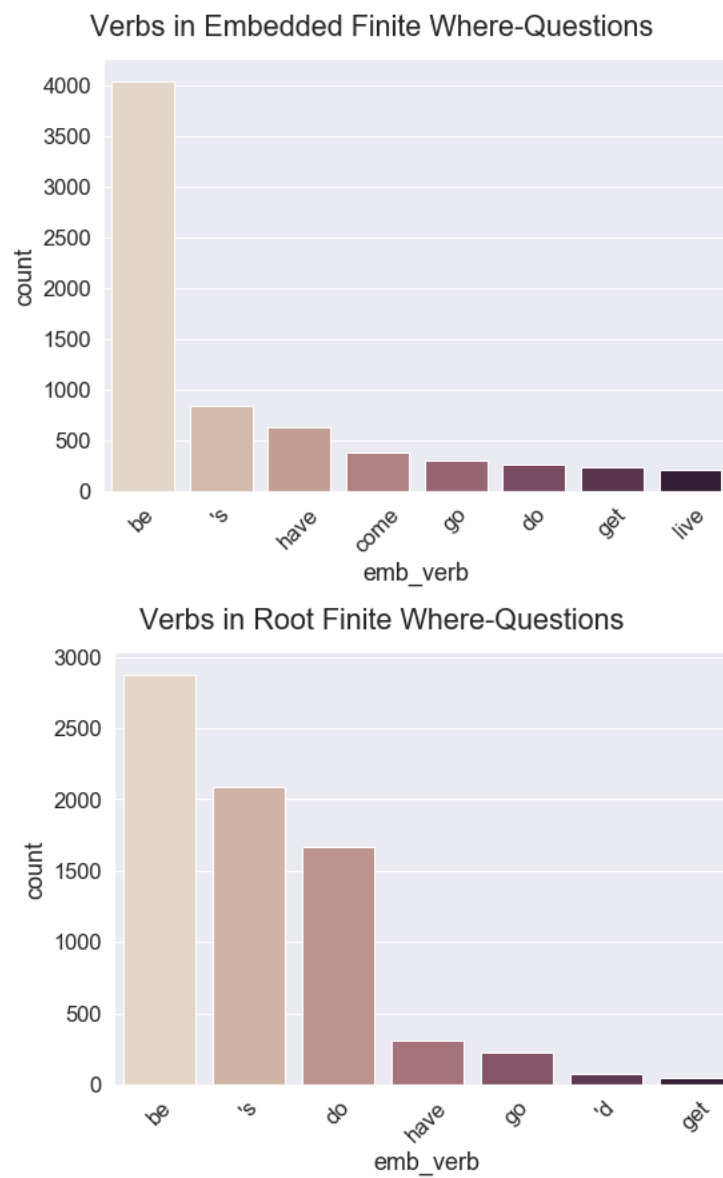
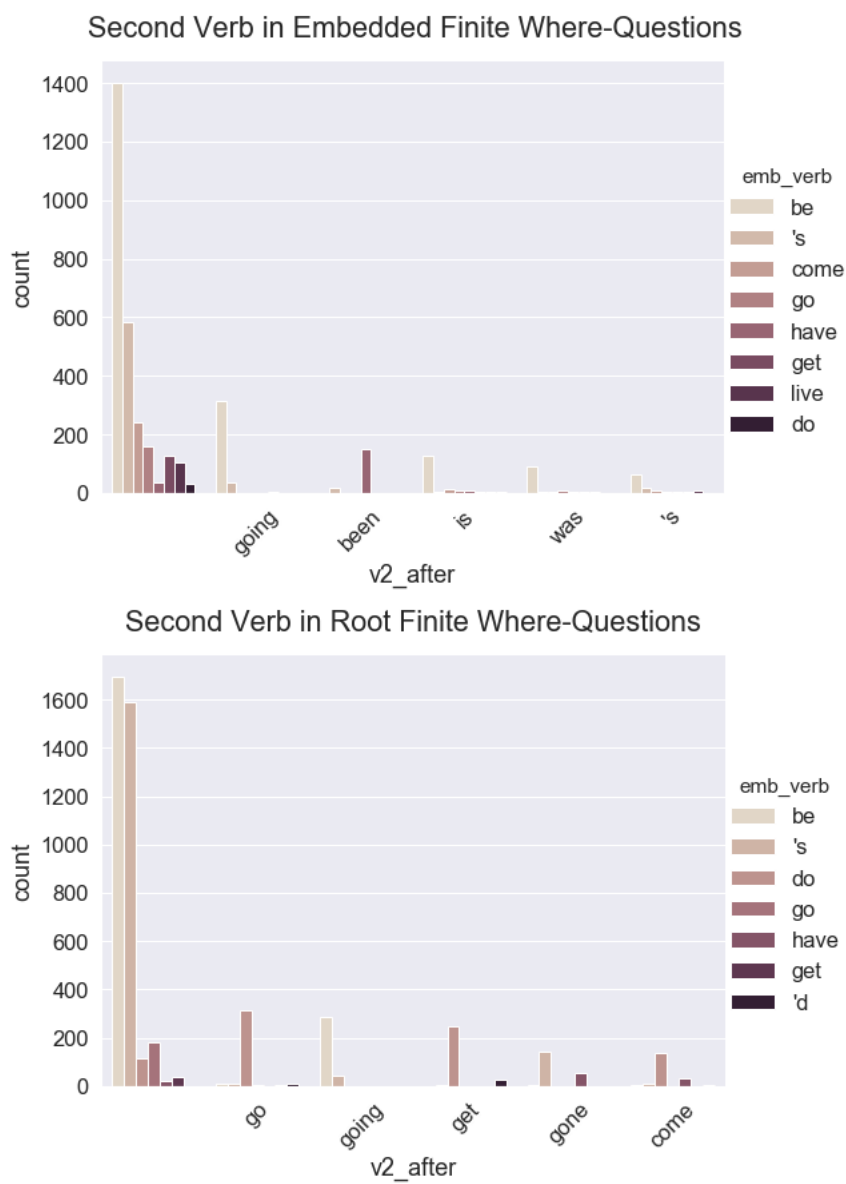


Figure E.32: Most frequent matrix verbs in Finite Embedded how-questions.

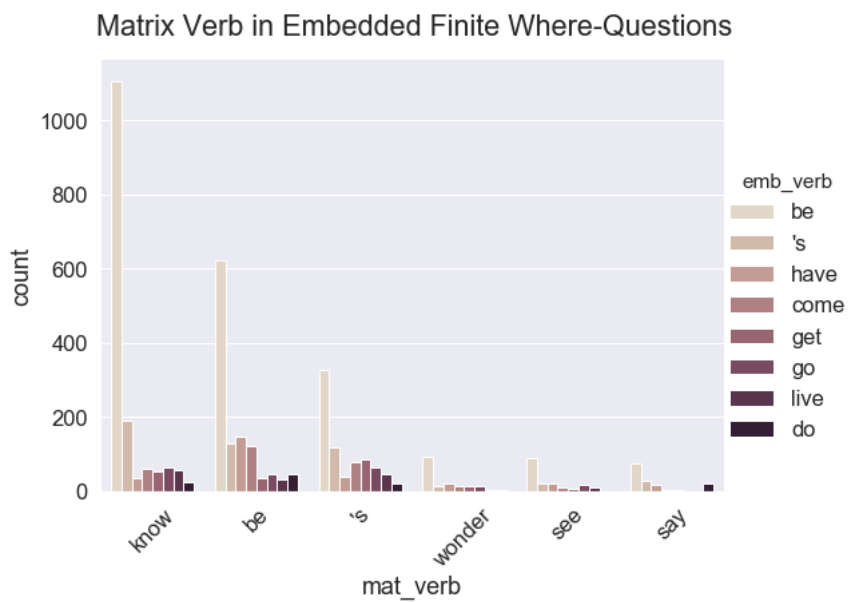


**Figure E.33:** Most frequent verbs in Finite Root and Embedded where-questions.

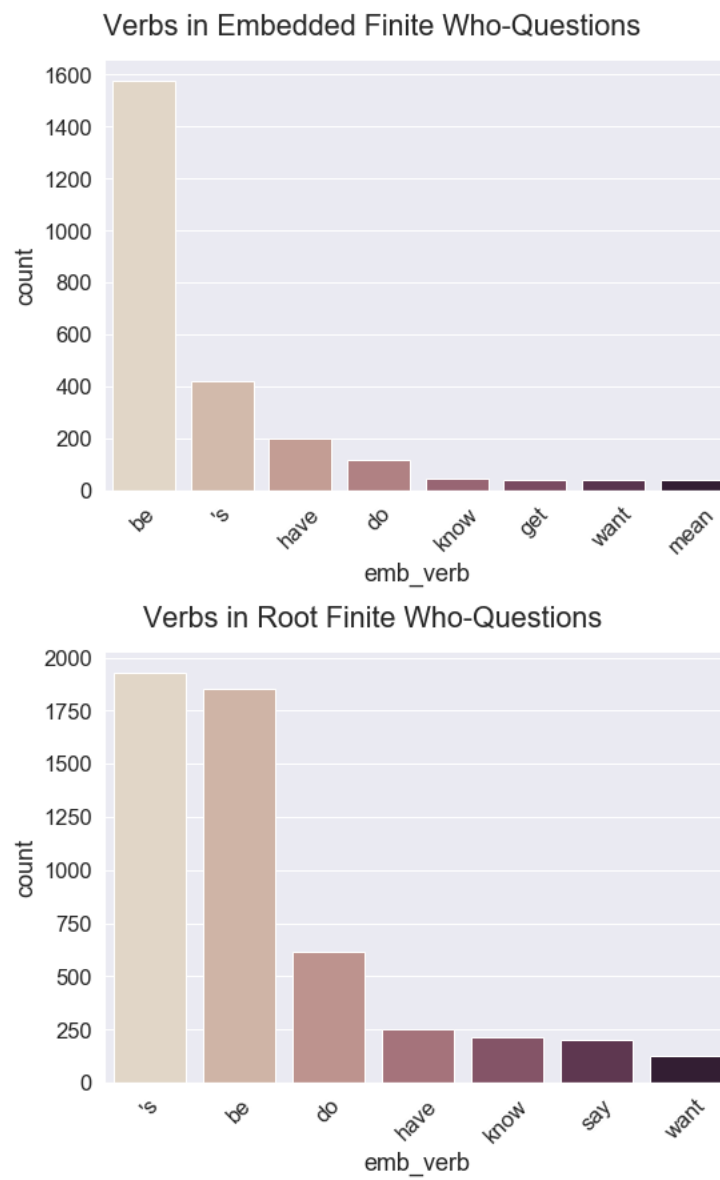


**Figure E.34:** Most frequent second verbs in Finite Root and Embedded where-questions.

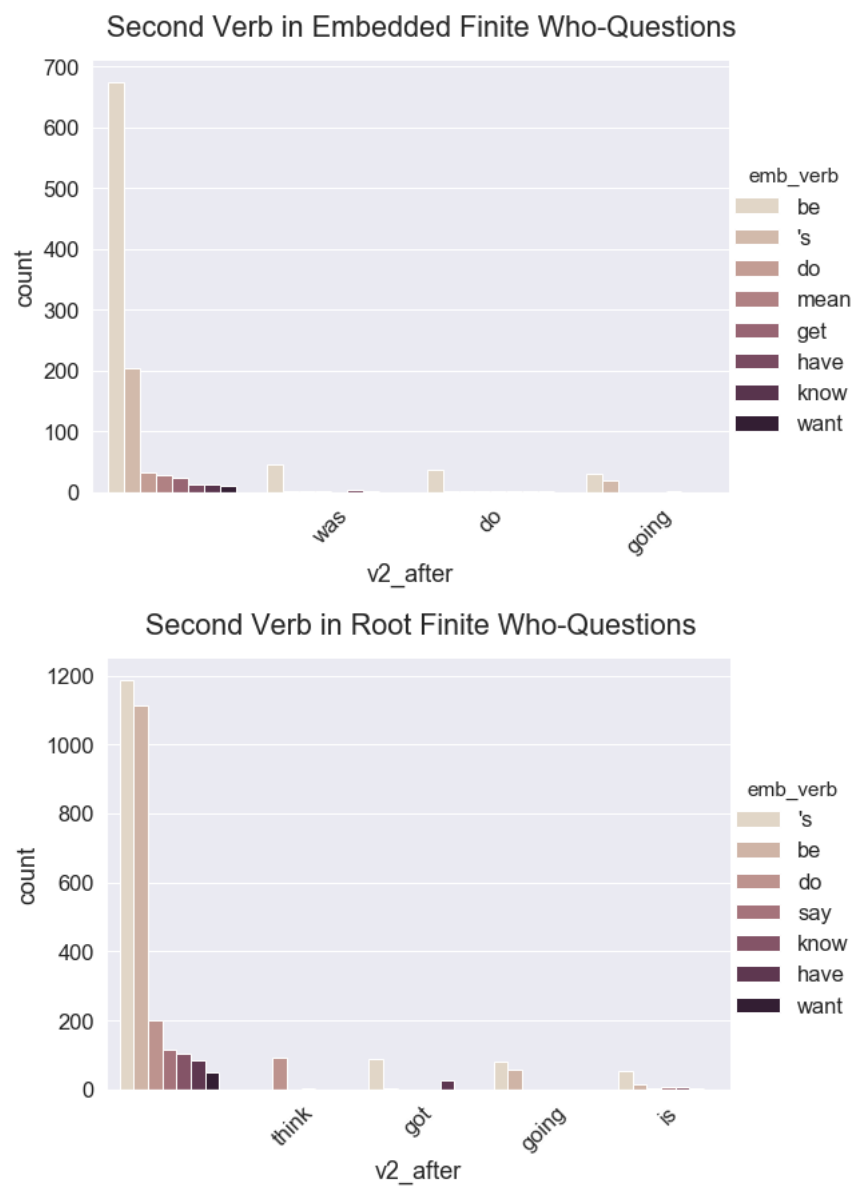




**Figure E.35:** Most frequent matrix verbs in Finite Embedded where-questions.



**Figure E.36:** Most frequent verbs in Finite Root and Embedded who-questions.



**Figure E.37:** Most frequent second verbs in Finite Root and Embedded who-questions.

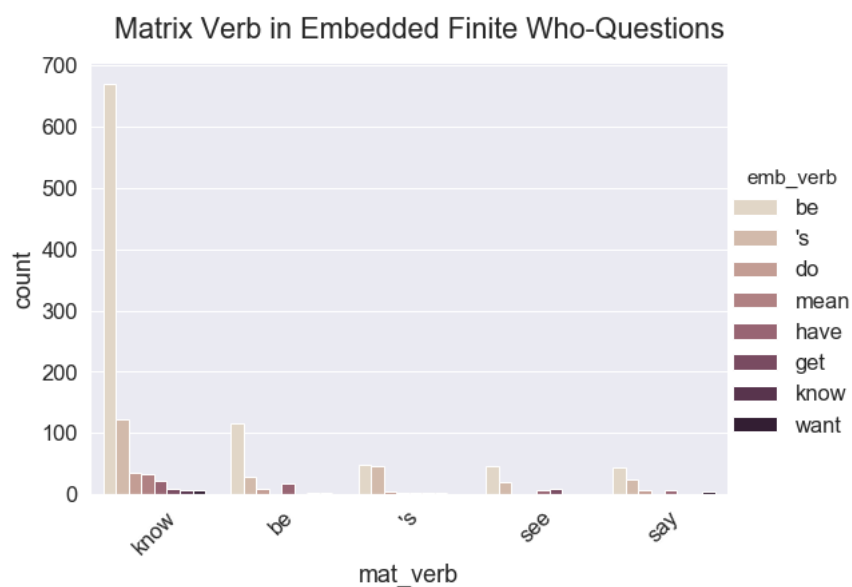


Figure E.38: Most frequent matrix verbs in Finite Embedded who-questions.

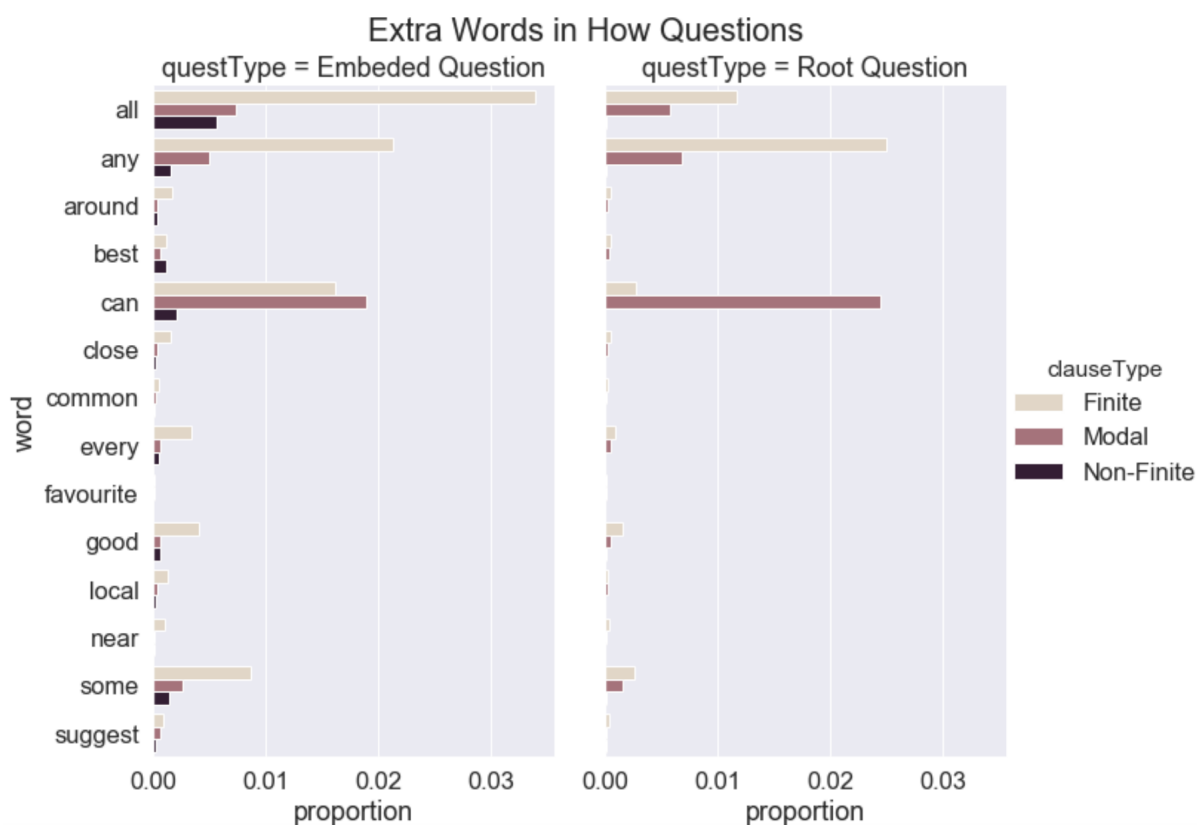
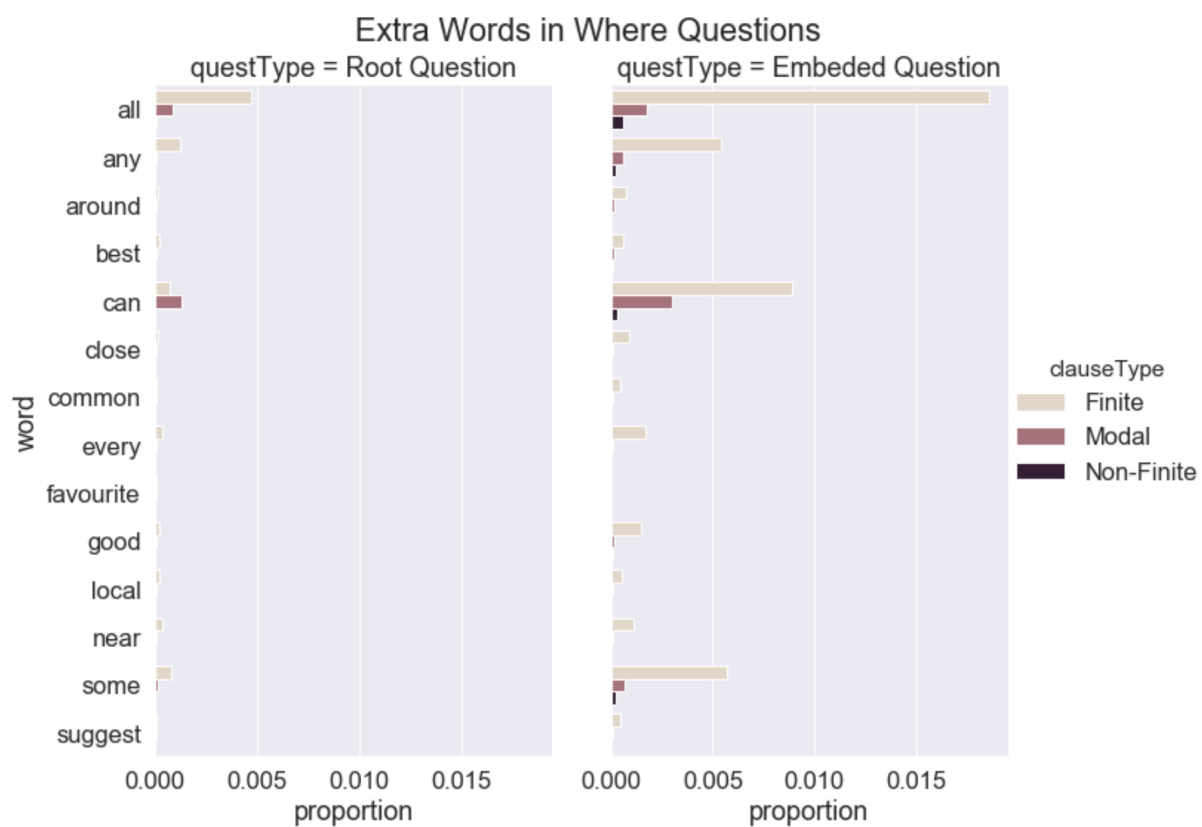
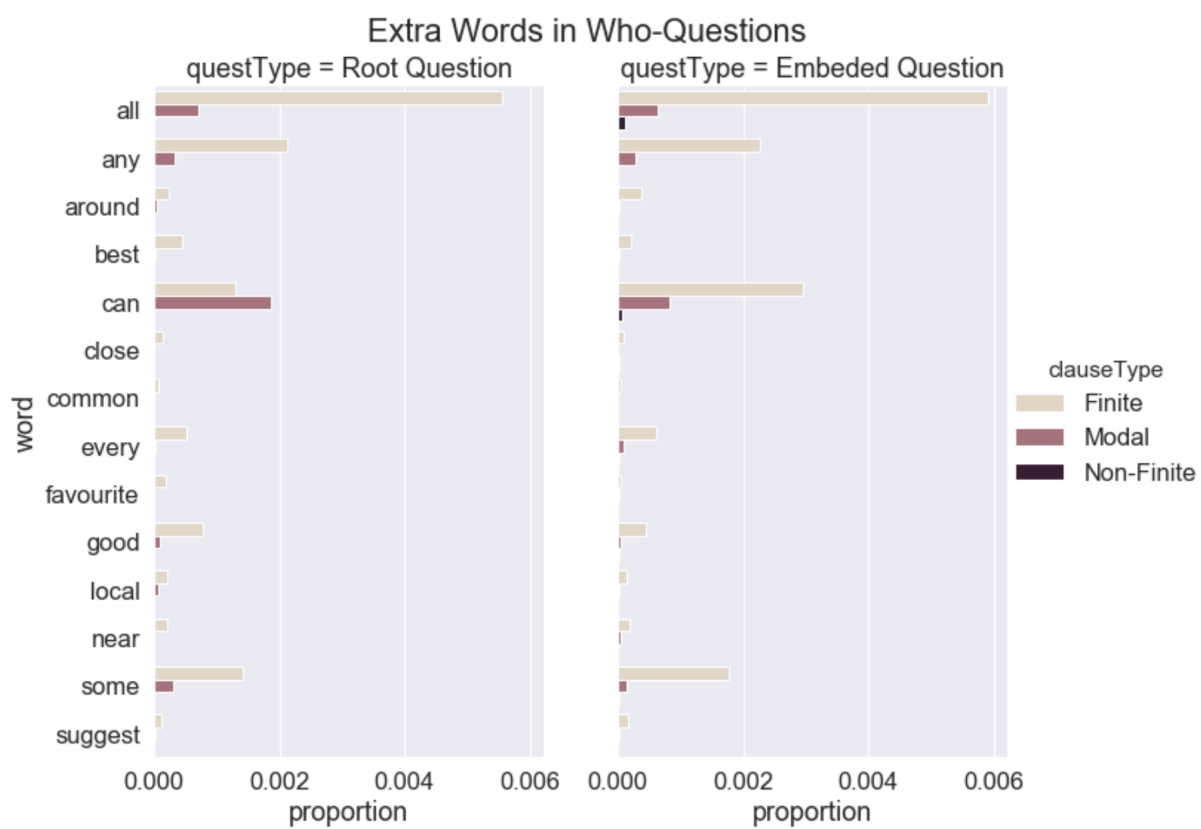


Figure E.39: Distribution of other potential cue words in how-questions.



**Figure E.40:** Distribution of other potential cue words in where-questions.



**Figure E.41:** Distribution of other potential cue words in who-questions.

## Appendix F

### Stimuli for Experiment 4

#### F.1 Test Items

##### F.1.1 High Stakse

###### (300) OYSTERS

Scientists have discovered a new strain of a dangerous virus that has contaminated oysters in the Mid-Atlantic. The Center for Disease Control is trying to prevent as much contamination as possible by tracking down the oysters which were sold to restaurants.

The CDC supervisor is tasked with tracking down the oysters. With this goal in mind, she asks her task force something relevant to the locations of the contaminated oysters.

**What question do you think the supervisor asked her task force?**

###### (301) FIREFIGHTERS

A local apartment building has caught on fire. The fire department has been called, and firefighters have just arrived.

The fire chief wants to ensure that the firefighters save as many tenants as possible. With this goal in mind, the chief asks his firefighters something relevant to the locations of the tenants.

**What do you think the fire chief asked his firefighters?**

###### (302) PROTESTS

Violent protests have erupted throughout the city due to recent unpopular legislation. Several protesters have been captured and held.

An anti-government group is planning to rescue the captured protesters for fear of what might happen to them. With this goal in mind, the leader asks her operatives something relevant to the locations of the captured protesters.

**What do you think the leader asked her operatives?**

(303) **TERRORISM**

The Capitol Police have just gotten word of imminent terrorist attacks targeting stores in the area. The police are collecting information about the stores.

The Chief of Police is responsible for preventing as much damage as possible. With this goal in mind, he asks his advisors something relevant to the locations of the stores.

**What question do you think the chief asked his advisors?**

(304) **ENVELOPES**

A disgruntled citizen has sent suspicious envelopes to various government officials. The FBI is trying to narrow down the offices.

The lead detective wants to start sending in teams right away to avoid harm to the office workers. With this goal in mind, she asks her team something relevant to the locations of the offices.

**What question do you think the detective asked her team?**

(305) **RABIES**

The local Animal Control Center has received calls about several animals infected with rabies. These rabid animals have been loose for the past 24 hours.

The director of the center is in charge of finding the infected animals, to prevent any further transmission of rabies. With this goal in mind, he asks his team something relevant to the locations of the infected animals.

**What do you think the director asked his team?**

## **F.1.2 Low Stakes**

(306) **PICTURE**

Mark is visiting New York City for the first time. He has heard the city has great museums.

He wants to see museums on his trip. With this goal in mind, he asks the waiter at a restaurant something relevant to the locations of the museums.

**What do you think Mark asked the waiter?**

(307) **FOOD**



Liz has just moved to New Jersey. She loves eating Italian food.

She thinks that her roommate, who loves Italian food, will know about the restaurants that serve Italian food. With this goal in mind, she asks her roommate something relevant to the locations of the Italian restaurants.

**What do you think Liz asked her roommate?**

(308) **COFFEE**

Johanna is new to Minneapolis. She loves drinking espresso.

She thinks her new roommate will know about the coffee shops. With this goal in mind, she asks her roommate something relevant to the locations of the coffee shops.

**What do you think Johanna asked her roommate?**

(309) **YOGA**

Billy has just moved to the area. He wants to start practicing yoga.

He thinks that locals will know about the yoga studios. With this goal in mind, he asks the people at a yoga-in-the-park event something about the locations of the yoga studios.

**What do you think Billy asked the people?**

(310) **MARKET**

Bruce and his family are visiting Amish country in Pennsylvania. He has heard that they are skilled wood-workers.

He thinks the owner of the bed and breakfast where they're staying will know something about the woodworking shops. With this goal in mind, he asks her something relevant to the locations of the woodworking shops.

**What do you think Bruce asked the owner?**

(311) **BIKE**

Kelly has decided to become more active. She joined a cycling club and wants to check out the bike shops.

She thinks that other members of the cycling club will know about the bike shops. With this goal in mind, she asks a club member something about the locations of the bike shops.

**What do you think Kelly asked the club member?**

## F.2 Filler Items

### F.2.1 Acceptable

(312) **PRESIDENT**

A local high-school social studies class is currently learning about the founding of the United States, and its first presidents.

The teacher wants to see if her students know the name of the third US president. With this goal in mind, the teacher asks her class something relevant to the first US presidents.

What question do you think the teacher asked her class?

(313) **GAMESHOW**

On a popular game show, contestants compete on teams by answering questions about a random topic.

On this episode, the host asks the contestants to name common items that people pack on a trip. With this goal in mind, he asks the teams something relevant to the topic of packing luggage for a trip.

What question do you think the host asked the contestants?

(314) **DJ**

A DJ at a local radio station has a lunchtime segment where listeners can call in to win exclusive concert tickets.

The DJ is going to give out tickets to the first caller who can name all four members of the famous band, the Beatles. With this goal in mind, he asks something relevant to the Beatles.

What question do you think the DJ asked the listeners of the radio program?

(315) **BAND**

Carrie is the lead guitarist of a band with a devoted following. She conducts a weekly online chat with the fans.

She is secretly using this week as an occasion to find out where the most fans are from in order to plan the band's tour next year. With this goal in mind, she asks the fans chatting with her something relevant to their locations.

What question do you think Carrie asked her fans?

**(316) HEALTH**

The first grade classes in local school district are learning about the health benefits of different food groups.

The first grade teachers want to assess what the children know about fruits and vegetables. With this goal in mind, they ask the children something relevant to the benefits of these particular foods.

What question do you think the first grade teachers asked the children?

**(317) OBAMA**

A 3rd grader is doing a report on Barack Obama, the former president of the United States. She wants to include information about what he was like as a president and as a father.

She remembers that the Obamas have a pet dog. She decides to include information about the dog in her report, such as its name and breed. With this goal in mind, the 3rd grader asks Siri something relevant to the Obamas' dog.

What question do you think the 3rd grader asked Siri?

**(318) DESIGN**

An interior designer is working on making over his best friend Annie's house. He thinks the colors are currently too drab.

The designer wants to bring a splash of color into the house, but he wants to know the colors Annie prefers. With this goal in mind, he asks his friend something relevant to her favorite colors.

What question do you think the interior designer asked his friend Annie?

**(319) PLANTS**

The owner of a local nursery has been approached by a customer who wants to rejuvenate her dying houseplants.

The nursery owner suspects that the customer is not providing her houseplants with enough water, so she needs to find out more about the customer's plant watering habits. With this goal in mind, the nursery owner asks the customer something relevant to the watering routine.

What question do you think the nursery owner asked the customer?

**(320) CASHEW**

Chloe is preparing a vegetarian lasagna using a new recipe for the first time. Typically, she uses mozzarella in her lasagnas, but this recipe calls for a cashew-based dairy substitute.

Chloe wants to know if the cashew 'cheese' sauce will taste good. With this goal in mind, she posts a question about cashew cheese to the message board of a well-known vegan cooking blog.

What question do you think Chloe asked the people on the message board?

(321) **MECHANIC**

Bill's car broke down, so he took it to his local mechanic. He is nervous, because he knows car repairs can often be expensive.

Bill wants to get a sense of how severe the damage is, and how much it is going to cost him. With this goal in mind, he asks the mechanic something relevant to the cost of the repair.

What question do you think Bill asked the mechanic?

(322) **DJ**

Sarah is planning an upcoming event for the members of her club on campus, and is looking for a space where she can host the event. She has been instructed to contact the scheduling office about available spaces.

Sarah calls the office to find out about the spaces that are available for her event. With this goal in mind, she asks the administrative assistant who answers something relevant to the locations that are available on campus.

What question do you think Sarah asked the administrative assistant?

(323) **TSHIRT**

Ellen works for a company that makes promotional T-shirts. Today, she had a meeting with some staff members of a local elementary school who want to order T-shirts in honor of their beloved principal's upcoming retirement.

Ellen wants to make sure she records the school's order correctly. With this goal in mind, she asks the school staff something relevant to the T-shirt order.

What question do you think Ellen asked the school staff?

(324) **OLYMPICS**

Frankie is traveling out of state for the weekend and is staying in a hotel. He is checking in at the front desk.

He wants to watch the snowboarding event of the Winter Olympics, but he is unfamiliar with the local TV channels. He thinks the front desk worker will know. With this goal in mind, he asks the front desk worker something relevant to the TV channels that might be showing the Winter Olympics.

What question do you think Frankie asked the front desk worker?

(325) **CHILI**

Andrew is making chili for the first time.

He wants his chili to be just spicy enough, so he wants to know which kind of chili peppers to use. With this goal in mind, he asks Google something relevant to the spice level of different kinds of chili peppers to use for chili.

What question do you think Andrew asked Google?

(326) **WEATHER**

Diane is getting dressed for school. The weather has been unpredictable lately. One day it's warm and muggy, another day it's cold and windy.

The Alexa app is usually a reliable source for the local weather forecast. Diane wants to know the weather today so that she can dress appropriately. With this goal in mind, Diane asks Alexa a question relevant to the weather.

What question do you think Diane asked Alexa?

(327) **DENTIST**

Yu'an just switched to a new dentist. The dentist is conducting a first-time examination.

The dentist has noticed some plaque accumulation and would like to know something about Yu'an's dental hygiene routine. With this goal in mind, the dentist asks Yu'an something relevant to the frequency of her flossing.

What question do you think the dentist asked Yu'an?

(328) **MATH**

A group of friends has been out for dinner together. They decided to share all of the dishes and split the bill at the end of the evening. The waiter has delivered the bill to the table.

The group decides that Angela, a math professor, will work out how much each person owes. With this goal in mind, they ask Angela something relevant to the bill.

What question do you think the friends asked Angela?

(329) **GARAGE**

Jo and Pat went to the movies together. Jo drove them both there, and parked in the theater's parking garage. After the movie ends, they head to the parking

garage. However, Jo has forgotten where the car is parked.

Jo knows that Pat has a really good memory, and thinks Pat will be able to help find the car. With this goal in mind, Jo asks Pat something relevant to the location of the car.

What question do you think Jo asked Pat?

(330) **COUNTING**

Isaac is a 5-year-old practicing his counting. He wants to count to 500, but this is a really challenging feat. Isaac is counting with his older brother, who is helping him practice.

Isaac just got up to 73 and can't remember what comes next, but he wants to keep going. With this goal in mind, he asks his older brother something relevant to the count list.

What question do you think Isaac asked his older brother?

(331) **GAME**

Aaron is a huge Packers fan. He had to miss the Monday night Bears-Packers football game to work.

When he was finally done with his shift, Aaron wanted to know the final score. With this goal in mind, he pulls out his phone and asks Siri something relevant to the final score.

What question do you think Aaron asked Siri?

(332) **NEWCAR**

David is in the market for a new car. He is visiting a car dealership today and is talking with the salesperson about the different options.

David has a wife and two young children. He wants a car that will comfortably seat his entire family. With this goal in mind, he asks the salesperson something relevant to the cars he is considering.

What question do you think David asked the salesperson?

(333) **HALLOWEEN**

Maddie's 4th grade class is having a Halloween party. She has volunteered her mom to bring party favors for the entire class.

Maddie's mom needs to gather more information about the class's preferences before she goes shopping. With this goal in mind, Maddie's mom asked Maddie something relevant to Maddie's 4th grade class.

What question do you think Maddie's mom asked Maddie?

(334) **CHOCOLATE**

Olga has just returned from a trip to visit her family in Russia. She brought back a box of assorted chocolates for her friend Veronica, who doesn't speak Russian.

Veronica loves chocolate, but she's allergic to nuts. She can't read the Russian writing on the box of chocolates Olga brought her, but wants to know more about the contents of the chocolates. With this goal in mind, Veronica asks Olga something relevant to the writing on the box.

What question do you think Veronica asked Olga?

(335) **HARRYPOTTER**

Padma and Archana are both avid Harry Potter fans. They have both read all of the books multiple times. They are both taking a quiz to see which of the four Hogwarts houses they would be placed in if they were students at Hogwarts.

Padma wants to know if she and Archana would be sorted into the same house. With this goal in mind, Padma asks Archana something relevant to the quiz about Hogwarts houses.

What question do you think Padma asked Archana?

(336) **BIRTHDAY**

Jared has been invited to his niece's birthday party. He doesn't really think of himself as being great with young children, and he always forgets how old she is.

Jared needs to buy an age-appropriate gift for his niece. With this goal in mind, he asks his mom something relevant to the age of his niece.

What question do you think Jared asked his mom?

(337) **TSA**

David is at the airport, getting ready to take a flight from Newark, NJ, to Tampa, FL. The security checkpoint setup has changed since he was last at the airport, and he's a little confused.

David has TSA pre-check, and needs to locate the designated line for this status, so that he can move through security more quickly. With this goal in mind, David asks one of the TSA agents something relevant to the lines.

What question do you think David asked the TSA agent?

(338) **EXAMS**

It's almost final exam time, and Marta is helping her friend Danielle get ready for her final exams by creating a study schedule.

Marta wants to make sure that Danielle knows when all of her final exams are so that she can set aside blocks of time for studying before each one. With this goal in mind, Marta asks Danielle something relevant to Danielle's final exam schedule.

What question do you think Marta asked Danielle?

(339) **PLUMBING**

Catherine's sink has just sprung a leak. She is determined to fix it herself, so she watches a YouTube video, and then heads to Home Depot to pick up the supplies she needs to repair it.

Catherine is not used to the layout of Home Depot, and thinks an employee can help her find the plumbing supplies aisle. With this goal in mind, she asks the employee something relevant to the location of the plumbing supplies.

What question do you think Catherine asked the Home Depot employee?

(340) **DISNEY**

Josh loves all things Disney. He's going to Disney World with his family for Spring Break, and he's super excited.

Josh wants to make sure he picks up a special souvenir mug for himself while he's at Disney World. He especially wants one with Mickey Mouse on it. With this goal in mind, he asks the shopkeeper at one of the souvenir stores something relevant to the selection of the mugs.

What question do you think Josh asked the shopkeeper?

(341) **PHONE**

Larry needs a new cell phone, but isn't sure what kind to get. He did some research online, but the moment he sets foot in the AT&T store, he becomes overwhelmed with all of the choices of cell phones and cell phone plans.

Larry has been approached by an AT&T employee. Larry thinks this employee can help narrow down his options. With this goal in mind, Larry asks the AT&T employee something relevant to his choices.



What question do you think Larry asked the AT&T employee?

(342) **CAKE**

Henry owns a bakery, and frequently bakes cakes for weddings. Today a couple is meeting with him about their wedding cake.

Henry wants to get an idea of the couple's taste and style preferences. With this goal in mind, he asks them something relevant to their cake preferences.

What question do you think Henry asked the couple?

(343) **POTLUCK**

Ernie recently hosted a potluck dinner party. He has a full container of pitted olives that someone left behind.

Ernie has decided he wants to use these olives to make an olive tapenade. With this goal in mind, Ernie gets out his iPad and asks Siri a question relevant to making olive tapenade.

What question do you think Ernie asked Siri?

## Appendix G

### Stimuli for Experiment 5

#### G.1 Stimuli from Bott & Noveck (2004) replication

	<b>fish</b>	<b>reptile</b>	<b>bird</b>	<b>mammal</b>	<b>insect</b>	<b>fruit</b>
token1	anchovy	alligator	eagle	cat	wasp	strawberry
token2	carp	crocodile	canary	horse	cockroach	banana
token3	cod	chameleon	crow	dog	cicada	apple
token4	piranha	iguana	owl	pig	ant	peach
token5	mackerel	lizard	sparrow	elephant	fly	pear
token6	herring	gecko	dove	sheep	mosquito	plum

#### G.2 Stimuli from Chemla & Bott (2013) replication

	<b>fish</b>	<b>reptile</b>	<b>bird</b>	<b>mammal</b>	<b>insect</b>	<b>fruit</b>
token7	salmon	cobra	parrot	bear	tick	watermellon
token8	tuna	tortoise	pigeon	monkey	beetle	kiwi
token9	trout	python	vulture	cow	bee	orange

#### G.3 Stimuli from Questions Task

### G.3.1 Aces

#### MODAL:

Who can play an ace? / Dana knows/said who can play an ace.

#### NO MODAL:

Who has an ace play? / Dana knows/said who has an ace to play.



Visual stimuli for card category ace.

### G.3.2 Black Card

#### MODAL:

Who can play a black card? / Dana knows/said who can play a black card.

#### NO MODAL:

Who has a black card to play? / Dana knows/said who has a black card to play.



Visual stimuli for card category black card.

### G.3.3 Club

#### MODAL:

Who can play a club? / Dana knows/said who can play a club.

#### NO MODAL:

Who has a club to play? / Dana knows/said who has a club to play.



Visual stimuli for card category club.

### G.3.4 Diamond

#### MODAL:

Who can play a diamond? / Dana knows/said who can play a diamond.

#### NO MODAL:

Who has a diamond to play? / Dana knows/said who has a diamond to play.



Visual stimuli for card category diamond.

### G.3.5 Eight

#### MODAL:

Who can play an eight? / Dana knows/said who can play an eight.

#### NO MODAL:

Who has an eight to play? / Dana knows/said who has an eight to play.



Visual stimuli for card category eight.



### G.3.6 Face Card

#### MODAL:

Who can play a face card? / Dana knows/said who can play a face card.

#### NO MODAL:

Who has a face card to play? / Dana knows/said who has a face card to play.



Visual stimuli for card category face card.



### G.3.7 Four

#### MODAL:

Who can play a four? / Dana knows/said who can play a four.

#### NO MODAL:

Who has a four to play? / Dana knows/said who has a four to play.



Visual stimuli for card category four.

### G.3.8 Hearts

#### MODAL:

Who can play a heart? / Dana knows/said who can play a heart.

#### NO MODAL:

Who has a heart to play? / Dana knows/said who has a heart to play.



Visual stimuli for card category hearts.

### G.3.9 Jack

#### MODAL:

Who can play a Jack? / Dana knows/said who can play a Jack.

#### NO MODAL:

Who has a Jack to play? / Dana knows/said who has a Jack to play.



Visual stimuli for card category jack.

### G.3.10 King

#### MODAL:

Who can play a King? / Dana knows/said who can play a King.

#### NO MODAL:

Who has a King to play? / Dana knows/said who has a King to play.



Visual stimuli for card category king.

### G.3.11 Number Card

#### MODAL:

Who can play a number card? / Dana knows/said who can play a number card.

#### NO MODAL:

Who has a number card to play? / Dana knows/said who has a number card to play.



Visual stimuli for card category number.



### G.3.12 Queen

#### MODAL:

Who can play a Queen? / Dana knows/said who can play a Queen.

#### NO MODAL:

Who has a Queen to play? / Dana knows/said who has a Queen to play.



Visual stimuli for card category queen.

### G.3.13 Red Card

#### MODAL:

Who can play a red card? / Dana knows/said who can play a red card.

#### NO MODAL:

Who has a red card to play? / Dana knows/said who has a red card to play.



Visual stimuli for card category red card.

### G.3.14 Six

#### MODAL:

Who can play a six? / Dana knows/said who can play a six.

#### NO MODAL:

Who has a six to play? / Dana knows/said who has a six to play.



Visual stimuli for card category six.



### G.3.15 Spade

#### MODAL:

Who can play a spade? / Dana knows/said who can play a spade.

#### NO MODAL:

Who has a spade to play? / Dana knows/said who has a spade to play.



Visual stimuli for card category spade.

### G.3.16 Ten

#### MODAL:

Who can play a ten? / Dana knows/said who can play a ten.

#### NO MODAL:

Who has a ten to play? / Dana knows/said who has a ten to play.



Visual stimuli for card category six.