WHAT THE QUD MODELS

by

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ABSTRACT

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Linguists and philosophers use models to study language and communication. But as in many model-based sciences, our ability to model linguistic and conversational phenomena outstrips our understanding of said phenomena. Indeed, we don't often think about or agree upon the subject matters of our models. This paper argues that we should.

To this end, I use Craige Roberts's model of communication—the Question Under Discussion (QUD) framework—as a proof-of-concept. I propose that the QUD framework's subject matter is *zetetic attentional shifts*: attentional shifts caused by the attitudes that drive inquiry. I then argue that my account ensures that the QUD framework provides the explanations linguists and philosophers want it to, and shows how the QUD framework is supported by work in the epistemology and cognitive science of inquiry. Accordingly, my account illustrates how providing subject matters for our models is both necessary (to ensure our models provide the explanations we want them to) and valuable (because they show us how our models relate to work in other fields).

Dedicated to Mami, Papi, and Jose

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1 Introduction

Model-based sciences are weird. Our ability to model a phenomenon can outstrip our understanding of what we're modelling. Example: eighteenth century thermometrics (Chang, 2004). Debates over, say, whether water's boiling point could be used to model and measure temperature happened and ended in the early and mid 1700s. This was well before we knew what temperature *is*. That began to happen in the late 1700s and early 1800s, with the development of caloric theory.

Semantics and pragmatics are in similar hot water.[1] Linguists and philosophers use models to study language and communication.[2] But our ability to model these phenomena outstrips our understanding of what we're modelling (Ball, 2018). Indeed, we often don't think about or agree upon what our models' subject matters are.[3][4]

How should we navigate this? We might think we're better off just doing semantics and pragmatics until the foundations of our models become tractable (see Yalcin, 2014). I disagree. I think finding a subject matter for our models is both necessary and valuable. Necessary because models need subject matters to provide explanations. Valuable because subject matters let us see how our models relate to other fields.

Of course, these kinds of methodological points are better shown than argued for. So my plan is to use Craige Roberts's model of discourse structure, the Question Under Discussion ("QUD") framework (1996; 2012b; 2018), as a proof-of-concept. In what follows, I argue the QUD framework needs a subject matter. I defend a proposal: the QUD framework models *zetetic attentional shifts*—attentional shifts caused by the attitudes that drive inquiry. And I argue this proposal shows why we should find subject matters for our models.

[1] Ball (2018) first made this comparison, as far as I know. He focuses on how semantics can be empirically successful without an underlying theory. I'm focusing on how semantics and pragmatics are instances of a broader phenomenon in model-based sciences.

[2] For more on models in semantics and pragmatics, see (Glanzberg, 2014, 2015, 2019; Nefdt, 2016a,b,c; Yalcin, 2014, 2018; Dupre, 2020).

[3] This is not a new observation. See (Ball, 2018; Yalcin, 2018; Westera, 2022; Harris, 2020b, 2022).

[4] Terminological note: I intend "subject matter" to be the noun phrase equivalent of "what a model is about." I don't mean anything more substantive, e.g., a Yablonian subject matter (Yablo, 2014).

Here's a play-by-play of the paper. §2 sets the stage. I introduce the QUD framework, summarize its applications across linguistics and philosophy, and argue that it needs a subject matter. The core idea, drawing from the philosophical literature on modelling, is that models need interpretations to provide explanations. Such interpretations include providing a subject matter for the model. So the QUD framework—and its central posit, the QUD—needs a subject matter to provide the explanations linguists and philosophers want it to.

§§3-4 build up to my account. Drawing from work on the cognitive science of curiosity, §3 argues that the attitudes that drive inquiry also guide attention. §4 combines this claim with two principles: one from the QUD framework itself, which claims that central cases of communication are joint inquiries; the other from the epistemology of inquiry, which claims that (joint) inquiries require us to hold the attitudes that drive inquiry. I argue that these principles—along with the empirical claim defended in §3—entail that communication involves zetetic attentional shifts. I then argue that these attentional shifts are the QUD's subject matter, and sketch some *prima facie* benefits of this proposal.

§5 compares my account to an intentionalist alternative, owed to (Roberts, 2012a, 2017). This alternative says the QUD models *intentional attentional shifts*—attentional shifts caused by shared communicative intentions. These intentional attentional shifts would be the QUD framework's subject matter. §5.1 argues that only my account captures the fact that intentions are sufficient, not necessary, to establish a QUD. §5.2. then considers an intentionalist objection to my view. My proposal predicts that the attitudes that drive inquiry are always present during communication. This seems wrong! But I argue that if we extend Stalnaker's notion of "acceptance" to questions, this prediction is tolerable.

§6 concludes by returning to the Bigger Picture. I argue that my proposal shows why providing subject matters for our models is both necessary and valuable. Necessary because otherwise the QUD framework would not provide the explanations we want it to. Valuable because my proposal connects the QUD framework to work in the epistemology and cognitive science of inquiry.

2 Stage-Setting

Let's start with a brief description of the QUD framework.

Following Stalnaker (1999, 2014), Roberts treats central cases of communication as *joint inquiries*.[5] On this picture, communication involves jointly ruling out answers to the question "what is the world like?" The key Robertsian insight, however, is that communicators are strategic. We don't try to answer this question all at once. We divide it into smaller, more manageable sub-questions. Thus, we can treat communication as an (implicit) question-answer exchange, where conversational participants are trying to answer the QUD: the sub-question live at a particular moment in the conversation.

Crucially, the QUD exerts interpretative influence. Conversational participants try to keep their contributions relevant to the question at hand (see Groenendijk and Stokhof, 1984). So an utterance is felicitious only when it proffers a candidate answer to the QUD. To illustrate, consider the following discourse.

(1) **A**: What is the best pizza place in North America?

   a. **B**: *Papa Ceo's* in Toronto.

   b. **C**: *Sal's Pizza* in Milwaukee.

   c. **D**: #*Wheaties* is the breakfast of champions.

A's utterance introduces a new QUD: "what is the best pizza place in North America?" B's and C's replies are (good!) candidate answers to this question. Hence (1a)'s and (1b)'s felicity. In contrast, D's reply misfires. *Wheaties* might be the breakfast of champions; but it's not pizza, let alone a pizza place. This renders D's reply irrelevant to the QUD. Hence (1c)'s infelicity.

However, it's worth emphasizing that the QUD has interpretative effects even when implicit. Stalnaker (1999, 2014) is a nice comparison point. He thinks conversational participants' mutually accepted information—what he calls "the common ground"—can have interpretative ef-

[5] I omit the "central cases" qualification hereafter.

fects even when it is not explicitly updated. For instance, suppose a goat randomly entered a classroom. Without speaking to each other, the instructor and the students immediately see and thereby (mutually) accept that there is a goat in the classroom. In such a scenario, Stalnaker thinks that the common ground has been updated, and can have interpretative effects. "There is a goat here" would be infelicitious to assert, for example, since that information is already common ground in the context. Likewise, Roberts thinks that the QUD can have interpretative effects even when it is not explicitly updated. For instance, we can still converse with the goal of figuring out the best pizza place in North America even if we never explicitly raise the question. In such a case, "what is the best pizza place in North America" would still be the live QUD. And it would still exert interpretative influence.

This flexibility has made the QUD framework popular. *Really* popular. Linguists have used the QUD to explain facts about Focus (Roberts, 2012b; Beaver and Clark, 2008), presupposition projection (Simons et al., 2010; Beaver et al., 2017), at-issue/not-at-issue content (Potts, 2004), and more. Philosophers have used the QUD to explain facts about thinking (Holguín, 2022), guessing (Dorst and Mandelkern, 2021), knowing (Schaffer and Szabó, 2014),[6] assertion (Fleisher, 2021; Mandelkern and Dorst, 2022), counterfactuals (Romoli et al., 2022), loose talk (Hoek, 2019), epistemic modals (Beddor and Egan, 2018; Phillips and Mandelkern, 2020), epistemic injustice (Keiser, 2021), reasons ascriptions (Weaver and Scharp, 2019),[7] conversational exculpature (Hoek, 2018), what-is-said and lying (Schoubye and Stokke, 2016; Stokke, 2018), and more.[8]

Given this popularity, it's all the more striking that there hasn't been much reflection on what the QUD framework's subject matter is (Westera, 2022). (As we shall see in §3, Roberts herself is an exception.) This isn't to say that we don't know how to use the QUD framework. We do. We usually model the QUD as the question (i.e., the set of propositions; see Hamblin,

[6] But see (van Elswyk, 2020b; Holguín, 2021). I'll stay silent on whether knowledge is QUD-sensitive.

[7] But see (Schroeder, 2020; Nair, 2022; Fogal and van Elswyk, 2022). I'm happy to outright say: I don't think reasons are QUD-senstive.

[8] For some more objections to the QUD framework, see (e.g., Abreu Zavaleta, 2018; Grindrod and Borg, 2019; van Elswyk, 2020a; Harris, 2020a,b; Buchanan and Schiller, 2021).

1973; Karttunen, 1977) denoted by an equivalent interrogative clause. Recall (1): speaker A uttered an interrogative clause, "what is the best pizza place in North America," and we took the QUD to be the question this clause conveyed. But knowing *how* to use a model is different from knowing *what* we are modelling. Indeed, questions (as semantic objects) are just part of the QUD framework's formal machinery. They can't by themselves tell us much about what the QUD framework is modelling.

Why care? In the philosophical literature on modelling, it is generally agreed upon that models need *interpretations* to provide explanations.[9] The modeller needs to say how the model is meant to be related to a target system in the real world. This target system is the model's subject matter: if the model is empirically successful, understanding the model's features provides an (indirect) explanation of the subject matter's features. Consider Bayesian models of perception in cognitive science, for example. These models have an explicit subject matter—the human perceptual system—and are meant to tell us how this system works in a (Bayesian) rational way (Eberhardt and Danks, 2011). Accordingly, insofar as these models are empirically successful, they provide us with an explanation of how the human perceptual system works in a rational way.

The QUD framework is a model. It needs an interpretation to provide explanations. So it

[9]For instance, proponents of the "syntactic" view (e.g., Faye, 2005; Lutz, 2012), "semantic" view (e.g., van Fraasen, 1987; Suppe, 1989; Suppes, 2002), "autonomy" view (e.g., Morrison, 1999), and "fictionalist" view (Hesse, 1970; Godfrey-Smith, 2007, 2009) all agree that models need interpretations. See also (e.g., Giere, 2002; Weisberg, 2007; Cartwright, 2010). Admittedly, however, anti-realists and neo-pragmatists might disagree here: they might say that some models provide explanations even if there is no "real-world" entity doing the explaining, e.g., because no such real-world entities are to be found. This would in turn need to be paired with an anti-realist account of explanation, on which explanations don't need to be grounded by ontic relations. Alas, I don't think these proposals would work for semantics and pragmatics. For we have good reason to be realists about semantic and pragmatic explanations.

Here's why. Suppose Dickie (2015) is right and there's a link between justification and aboutness: a body of beliefs is justified just in case it's about an object (or, more neutrally, about *something*) in the real world. Now suppose (as most working linguists and philosophers would agree) that our beliefs about semantics and pragmatics are *justified* by our models. We understand semantics and pragmatics much more than we used to, and our increased understanding is because we've built models to understand this stuff. If that's right, then our beliefs about semantics and pragmatics are *about* something in the real world. Since our beliefs are justified by our models, we need to say how our models let us lock on to a real-world entity. In turn, this means we need to say a bit about *what* real-world entity our models—and the explanations they provide—let us lock on to. But that requires us to think that our models provide explanations that *describe* (or at least help us lock on to) reality. For additional discussion, see (Szabó, 2019).

needs a subject matter. And so we should be worried we *can't* yet provide it one.[10] The QUD framework is meant to provide explanations across many regions of linguistics and philosophy. Insofar as these explanations go awry, it should be for empirical reasons. Not because the framework lacks a subject matter, and thereby can't provide explanations in the first place. This would be an explanatory disaster across multiple disciplines.

Explanatory disasters ought be avoided. So we need to provide a subject matter for the QUD framework. Given the QUD's central role in the QUD framework's explanations, this amounts to giving an account of what the QUD models. The next two sections defend my proposal.

3 Interrogative Attitudes Guide Attention

The next two sections build up to my account of what the QUD models. This section surveys some empirical work to argue that the attitudes that drive inquiry also guide attention. The next one combines this claim with two principles to deliver my view: I think the QUD models zetetic attentional shifts.

Let me introduce some terminology before we begin. Thus far, I've been talking about "the attitudes that drive inquiry." That's a mouthful. So following Friedman (2013), I'll use the term "interrogative attitude" instead. As Friedman thinks about them, interrogative attitudes are distinctive in taking *questions*—not, say, propositions—as their content.

(2) a. I'm curious about *whether it's raining*.

b. I wonder *what day it is*.

c. I'm deliberating *which way I should go*.

[10] I'm not the first to argue something along these lines. Some philosophers of cognitive science (e.g., Weinberger and Allen, 2021; Andrews, 2021) argue that building a formal model of a phenomenon (in this case, QUD-sensitive effects) does not by itself constitute an *explanation* of that phenomenon. We only get an explanation once we spell out the relationship between the model and the phenomenon of interest—in this case, the relationship between our formal models of communication and the world. This paper is meant to spell out the latter half of that relationship, by providing an account of what real-world (psychological) phenomenon the QUD framework models.

For our purposes, we won't need a fully fleshed out theory of the interrogative attitudes. As long as they form a natural class, we only need the claims I defend shortly.

We can now state this section's target claim more precisely.

> INTERROGATIVE ATTITUDES GUIDE ATTENTION ("IAGA"): a subject's interrogative attitude towards a question guides her attention towards (full or partial) potential answers to the question.[11]

To defend IAGA, I need two empirical claims.

> CURIOSITY GUIDES ATTENTION ("CrGA"): a subject's curiosity towards a question guides her attention towards (full or partial) potential answers to the question.[12]

> CURIOSITY IS BASIC ("CrB"): curiosity requires few, if any, conceptual resources on a subject's behalf.[13]

I'll defend CrGA and CrB in turn. I'll then flesh out how they support IAGA.

[11] More formally: a subject S's interrogative attitude towards a question Q guides her attention towards ϕ^Q, a proposition that partially or fully answers Q.

[12] It's worth noting that stronger proposals abound in the literature. For instance, Carruthers (2018) speculates that if attention is always guided by a question-directed search—as Corbetta et al. (2008) argue—then we might think that *curiosity* is responsible for this question-directedness. Thus, on Carruthers's view, curiosity *always* guides attention. However, for our purposes, we only need the weaker claim that curiosity *can* guide attention towards a question's answers. So that's the claim I'll defend here.

[13] There's actually some controversy here on how to explain curiosity's basicness. It is natural to think about curiosity as a "desire" or a "want" for knowledge. But this way of glossing things seem to suggest that curiosity is cognitively demanding. In particular, it seems to require that a critter have what psychologists call *meta-representation*: the ability to think about one's own mental states. If curiosity is a desire for knowledge, and insofar as desires are propositional attitudes, it seems as though curiosity requires a critter to (i) have a KNOWLEDGE concept, and (ii) be able to *desire* to *know* a given state of affairs. This raises two related problems for the sort of basicness I'll be arguing for. One, if curiosity is so cognitively demanding, it is implausible to attribute it to all the critters that we've discussed. Two, if curiosity is indeed so demanding, we would expect it to not be conceptually basic—since it would be cognitively taxing for a critter to be curious.

In the empirical literature, the usual move has been to try to say how critters with few cognitive resources can engage in meta-representation. For instance, Calhoun et al. (2014) propose a model on which meta-representation might be present in critters with only three neurons. In the philosophical literature, the usual move has been to *de-intellectualize* curiosity, i.e., argue that curiosity doesn't require meta-representation after all (Kvanvig, 2003; Whitcomb, 2010; Friedman, 2013; Carruthers, 2017, 2018, 2021). I myself prefer the philosopher's response, but I won't be adjudicating the issue here. All that matters is that every party agrees that curiosity is basic. I'll detail some reasons why below.

3.1 Curiosity Guides Attention

Start with CrGA.

There is some neurological evidence that curiosity guides attention. Gottlieb et al. (2013, 2016) summarize results that suggest the neural pathways activated when a subject engages in visual attention are also activated when a subject is curious. They argue that the best explanation for this effect is that whenever a subject is curious, her attention is activated as well. However, this evidence has limits. For one thing, these sorts of inferences are notoriously finicky: the fact that a brain region associated with a mental state is activated does not itself entail that mental state is realized. We'd need some additional premises to make Gottlieb et al.'s argument stick. More importantly, we need something stronger anyways. We need evidence that curiosity guides a subject's attention *towards a question's answers*.

Thankfully, such evidence abounds as well. One key source of evidence comes from developmenal psychology. Researchers have long-argued that curiosity plays a key role in guiding early learning (Sokolov, 1963; Berlyne, 1978; Kidd et al., 2014; Kidd and Hayden, 2015; Twomey and Westermann, 2018). In particular, curiosity is thought to play a crucial role in solving what Kidd and Hayden (2015) call the "sampling problem." In order to learn, children need to be able to guide their attention towards potential sources of information. But they're children—they have a lot to learn! So they need a way to decide which sources of information they need to attend to first. The consensus is that *curiosity* plays this role. It is children's curiosity that guides their attention towards the most valuable sources of information. This allows them to learn in a manageable fashion: by only attending to the sources of information that will satiate their curiosity.

To see why this consensus is well-motivated, let's walk through one study: (Kidd et al., 2014). Their focus is on how the sampling problem affects children's ability to learn based upon what they hear. Auditory stimuli contain lots of information (e.g., noise level, pitch, rhymthic structure, etc.), so children need to find a way to focus on the information they need. There's two

ways this could be done. Children could attend to the information as it comes: for instance, if the sound is particularly loud, they could attend to that information since it's more available. Or children could attend to information based on how it fits in with what they know: for instance, if the information conveyed by pitch is more novel, children could attend to it—even if the information conveyed by noise levels is more available (e.g., because the sound is louder). But there's a limit to this. If the information is *too* novel, children would not attend to it, since it doesn't fit in with what they know. Thus, if children use the second strategy, we would expect their attention to have a "u-shaped" curve. They would be highly likely to stop attending to information that's either not novel or too novel, but would keep attending to information that's novel enough.

Kidd et al. found this kind of u-shaped curve, replicating similar results from (Kidd et al., 2010, 2012). They measured how 34 children attended to sound sequences that differed in predictability. Some sound sequences were highly predictable (e.g., "AAAB-A"). Others were highly unpredictable (e.g., "AAAB-C"). And others were only somewhat unpredictable (e.g., "AAAB-B"). The children preferred to attend to the somewhat unpredictable sequences, whereas they dispreferred attending to the highly predictable or unpredictable sequences. On the assumption that curiosity and novelty are tightly related (see e.g., Loewenstein, 1994; Kidd and Hayden, 2015), the best explanation for this novelty-based effect is that children are attending to what they're curious about. So Kidd et al's results suggest that curiosity affects how children direct their attention in learning. (Indeed, in Kidd and Hayden (2015), Kidd herself interprets the results this way.)

Here's the upshot. For curiosity to solve the sampling problem, it needs to be able to guide a subject's attention towards a question's answers. Otherwise, there would be no guarantee that children would attend to the sources of information condusive to their learning. So, insofar as curiosity *does* solve the sampling problem—as Kidd et al and others suggest—this gives us good reason to think that curiosity guides attention towards a question's answers.

Why is curiosity able to guide attention? We can draw from Wojtowicz and Loewenstein

(2020) for an explanation. Attention requires a certain amount of cognitive resources. But most forms of attention-guidance (e.g., consciously thinking about what we ought attend) *themselves* are resource-intensive. So cognitively limited agents like us need resource-efficient ways to direct our attention. We can follow Wojtowicz and Loewenstein (2020) in thinking of curiosity's attention-guiding profile as one way to solve this problem. Insofar as curiosity is basic (as we shall see shortly), it lets us guide our attention *without* consuming precious cognitive resources. Hence why it can solve the sampling problem. And why it can guide attention more generally.

3.2 Curiosity is Basic

Let's turn to CrB.

If curiosity is a basic interrogative attitude, we would expect it to arise *early on* in cognitive development. Infants and children have fewer, less sophistacted conceptual resources than adults. But if curiosity is basic, this shouldn't stop them from being curious. This prediction is borne out. Not only does curiosity arise early on in cognitive development—between 6 and 12 months, by most estimates (Twomey and Westermann, 2018; Carruthers, 2020). As Kidd et al. and others show, curiosity plays a key role in solving the sampling problem in early learning.

Likewise, if CrB is true, we would expect curiosity to be prevalent among non-human animals. The reasoning here is similar: other animals have fewer, less sophisticated conceptual resources; but if curiosity is basic, this shouldn't stop them from being curious. Again, this prediction is borne out. Curiosity has been attributed to non-human primates (Damerius et al., 2017; Yan et al., 2018; Wang and Hayden, 2019), mice (Ackermann et al., 2010; Ahmadlou et al., 2021), horses (Christensen et al., 2021), and pigeons (Gipson et al., 2009). It has even been attributed to bees (Carruthers, 2021) and worms (Calhoun et al., 2014). To see why these attributions are well-motivated, let us again look at one study: (Wang and Hayden, 2019).

The study works as follows. Psychologists tend to think that curiosity is an *intrinsic*—non-instrumental—drive to seek information. This is an intuitive point; it's odd to suggest a high school student is curious about algebra when their only goal is to graduate, for example. But it

raises experimental problems. While we can observe non-human animals' information-seeking behavior, it's not obvious how to ensure that behavior is *intrinsically* motivated. Here's how Wang and Hayden got around that. They presented two pre-trained Rhesus macaques with two offers. The offers differed in (i) how informative they were, (ii) how likely they were. If macaques chose the offer with the highest payoff (informativeness × likelihood), they were rewarded with water—so choosing the right information was instrumentally valuable. Crucially, some offers included *counterfactual outcomes*: information about the offer the macaques didn't choose. The macaques were not given additional water if they chose the offer with a counterfactual outcome. So this additional information was *not* instrumentally valuable.

What Wang and Hayden (2019) found is that the macaques chose the offer with the counterfactual outcome anyways. Indeed, in some trials the macaques chose offers based solely on the informational value, even when the offer with the counterfactual outcome was not instrumentally valuable (e.g., because it was highly unlikely). This suggests that macaques do indeed manifest curiosity. In this case, that curiosity led them to seek information about counterfactual outcomes, even when this information had no instrumental value. Upshot: along with the other studies we canvassed, Wang and Hayden's findings suggest that non-human animals manifest curiosity too.

In fact, there's a good evolutionary explanation for curiosity's prevalence in the animal kingdom, owed to (Loewenstein, 1994). We've seen that curiosity guides learning. However, learning is *hyper-adaptive*. A species that consistently learns about its environment is much better placed to navigate it. So there is a strong evolutionary pressure for a species to be guided to learn. And since curiosity guides learning, we would thus expect that all sorts of species to manifest curiosity. This is what we find.

Accordingly, it seems that CrB's predictions are borne out. We find curiosity is prevalent in children and non-human animals. There is a good evolutionary explanation for this to boot. Taken together, then, the empirical evidence suggests that curiosity is basic.

3.3 From Curiosity to Interrogative Attitudes

Wrapping up: we've defended CrGA and CrB. How do they support IAGA? Admittedly, there's a few ways to go here.[14] But here's my preferred way.

As we saw, when an attitude is basic, it arises early on in human cognitive development. In turn, this makes it likely that our ability to hold other, more sophiscated attitudes is *bootstrapped* upon the more basic ones. To give a recent example of this line of thought: Harder (2022) argues that our ability to intentionally engage in joint action is preceeded by, and bootstrapped upon, a more basic need to engage in joint action with others. So we might think that since curiosity is basic, our ability to hold more sophisticated interrogative attitudes is bootstrapped upon our ability to be curious. And since curiosity guides attention, we might think that this bootstrapping process makes the other interrogative attitudes attention-guiding, too. Again, Harder (2022) is a nice comparison point: in the same way our basic need to engage in joint action secures joint attention, our intentions to engage in joint action—which are bootstrapped on our basic need to do so—can secure joint attention as well. Therefore, the truth of CrGA and CrB gives us good reason to think IAGA is true. Since the other interrogative attitudes are bootstrapped on curiosity, it's likely that they inherit curiosity's attention-guiding profile too.

The reader might worry that this argument isn't enough. For while bootstrapping might make it *likely* that all interrogative attitudes guide attention, it by no means ensures it. This is a fair point. But in this case, we have reason to think other interrogative attitudes inherit

[14] For instance, here's a route more familiar to epistemologists. Consider how Williamson (2002) thinks about knowledge. For Williamson, knowledge is basic in the following way. Human cognitive life involves factive mental states: mental states we hold towards propositions only if those propositions are true. Knowledge is basic in that, if we hold any factive mental state towards a proposition, we know that proposition. For instance, Williamson thinks that if a subject sees p, that subject knows p.

Usually, this kind of basicness is thought to be related to the fact that knowledge—just like curiosity—arises early on in human cognitive development and in non-human animals (see e.g., Nagel, 2017; Phillips and Norby, 2021; Phillips et al., 2021). And so we might think that curiosity is basic in just the way knowledge is: if a subject holds an interrogative attitude towards Q, that subject is curious about Q. This, along with CrGA, would entail IAGA. Since holding an interrogative attitude would require being curious, curiosity would always be present doing attention-guiding work.

However, this route is *strong*. It requires curiosity to be present any time we hold other interrogative attitudes. So I won't be pursuing it here.

curiosity's attention guiding profile.

Let's use deliberation as an example. Some eye-tracking studies (Rahn et al., 2016; Mormann et al., 2020) suggest that subjects who consciously deliberate their choices display differences in visual attention. For instance, Rahn et al. (2016) found that participants who deliberated on their lottery choices attended to information containing both the likelihood *and* the outcome of winning a lottery. In contrast, participants who did not deliberate only attended to information containing the likelihood of winning the lottery. Additionally, recent philosophical (Dever and Schiller, 2021) and psychological (Vo, 2020; Orquin et al., 2021) work suggests that attention also plays an important role in decision-making: which features of a situation an agent attends to affects which decision she makes. On the assumption that (practical) deliberation partly involves determining and representing the features of a choice-scenario, this in turn suggests that deliberation guides attention towards certain features of the choice-scenario. So, while the work here is nascent—and there are worries to be had[15] —there is some evidence to suggest that deliberation also guides attention. My defense of IAGA explains why. Deliberation, through bootstrapping, inherits curiosity's attention-guiding profile.

It remains to be seen whether similar findings can be established for other interrogative attitudes. For now, however, I think CrGA and CrB give us good reason to believe IAGA. In the next sub-section, I'll combine IAGA with two principles to deliver my account.

4 The QUD Framework Models Zetetic Attentional Shifts

As advertised, my interpretation of the QUD calls for two more principles. Here's our first one.

COMMUNICATON AS INQUIRY ("CI"): to engage in linguistic communication is to

[15]For instance, it's not obvious that these literatures have the same notion of "attention" in mind (see e.g., Anderson, 2011). A similar worry could be raised for how philosophers and psychologists understand "deliberation." It would take us too far afield to address these worries here. But my strategy would involve either (i) seeing whether there is a suitable notion of "attention" and "deliberation" that is consistent with both what philosophers and cognitive scientists have in mind, or (ii) seeing whether a folk psychological understanding of "attention" and "deliberation" could make sense of the results.

jointly engage in an inquiry towards some question at hand.[16]

CI is another way of stating a core Stalnakerian and Robertsian credo. When we engage in communication, we are inquiring, e.g., by ruling out answers to the question "what is the world like?" For present purposes, I'll take CI for granted, since my goal is to offer a proposal amicable to the QUD framework.

Our second principle is owed to (Friedman, 2019).

> INQUIRY REQUIRES INTERROGATIVE ATTITUDES ("IRIA"): a subject ought to see to it that, as she inquires into a question, she holds an interrogative attitude towards the question.[17]

It's beyond this paper's scope to fully defend IRIA. But let me briefly motivate it. For one, it explains why inquiry is a question-directed activity. The fact that we look into questions—not, say, propositions—makes sense if we ought to hold interrogative attitudes as we inquire. Furthermore, Friedman motivates this principle by contrasting cases like the following.

> MORSE$_1$. Morse$_1$ is an inspector, tasked with discovering who killed the doctor. He has a guess as to who did it; but he's unsure, so he still wonders who the murderer is. As a result, he proceeds in the way a normal inquirer would: he searches the scene, talks to potential witnesses, etc.

> MORSE$_2$. Morse$_2$ is an inspector, tasked with discovering who killed the doctor. But there's a catch: *he* killed the doctor, and he knows (indeed, is certain) that he killed the doctor. As a result, to keep others off his tracks, he proceeds in the way a normal inquirer would: he searches the scene, talks to potential witnesses, etc.

Intuitively, Morse$_1$ seems like a genuine inquirer. Morse$_2$ does not. However, the only difference between the cases is that Morse$_1$—but not Morse$_2$—holds an interrogative attitude (wonder)

[16] More formally: n-many subjects engage in linguistic communication only if they are engaged in a joint inquiry towards some question Q. It's also worth noting that this version, as stated, is too strong. It should say that *in central cases*, to communicate is to inquire. However, demarcating what makes a case "basic" would take us too far afield. So I've followed the convention I established in footnote 5 and omitted the qualification.

[17] More formally: a subject S ought to see to it that she inquires into a question Q at a time t only if she holds an interrogative attitude towards Q at t.

towards the question at hand. Insofar as we want to take this intuitive contrast seriously, IRIA seems like the best explanation.[18]

With these principles in hand, I can now deliver my proposal for what the QUD models. The thought goes like this.

1. To engage in linguistic communication is to engage in a joint inquiry towards some question at hand [CI].
2. As a subject (permissibly) communicates, they must hold an interrogative attitude towards the question at hand [from 1, IRIA].
3. ∴As a subject (permissibly) communicates, her attention will be guided towards potential answers to the question at hand [from 2, IAGA].

Insofar as linguistic communication is a form of joint inquiry (by CI), we need to hold interrogative attitudes towards the question at hand (by IRIA). But (by IAGA) these attitudes cause attentional shifts: they guide our attention towards answers to the question at hand. So communication will involve *zetetic attentional shifts*: attentional shifts caused by the interrogative attitudes we hold as we communicate. I think the QUD models these zetetic attentional shifts.

Let me walk through an example. Let's use (1) (presented as (3)) again.

(3) **A**: What is the best pizza place in North America?

   a. **B**: *Papa Ceo's* in Toronto.

   b. **C**: *Sal's Pizza* in Milwaukee.

   c. **D**: #*Wheaties* is the breakfast of champions.

[18] Admittedly, IRIA is not uncontroversial. For instance, Falbo (2021); Woodard (2022) argue that once we look at double-checking—inquiries in which a subject looks into a question she already has an opinion on—IRIA is false. While I don't have the space to do justice to their arguments, my preferred response to them goes something like this.

Let's think a bit more about what sort of norm IRIA is supposed to be. If it is constitutive, then Falbo and Woodard are right: their arguments show that an agent can break IRIA without thereby losing status as an inquirer. But IRIA need not be constitutive. For example, suppose IRIA is a strong *prima facie* epistemic norm. (This might seem like too big a concession, but all it amounts to is that sometimes the norms of inquiry are overruled by other considerations *without* thereby making us non-inquirers.) On this picture, double-checking just involves a familiar normative tension between the norms of inquiry and the norms of evidence-gathering. This tension is usually navigated without outright rejecting the norms of inquiry (Friedman, 2020; Thorstad, 2021). So the arguments Falbo and Woodard provide need not force us to reject IRIA.

Here's what I want to say. In asking "what is the best pizza place in North America", A represents themself as being curious about the question (see Whitcomb, 2017). Since there is no funny business in the conversation, B through D want to be cooperative. So they'll take up some interrogative attitude and try to answer the question. Accordingly, there will be a zetetic attentional shift: their interrogative attitudes will guide their attention towards the question's potential answers.

This zetetic attentional shift will have interpretative effects. B and C provide information consistent with what everyone is attending to, since they're providing candidate answers to the question at hand. Hence why their replies are perfectly fine. D does not. They provide information that is irrelevant to what everyone else is already attending to. Hence why their reply is infelicitous. On my picture, the QUD helps us model how zetetic attentional shifts create such interpretative effects. These zetetic attentional shifts are the subject matter of the QUD framework.

So much for what my account says. Why believe it? For one thing, notice that my account directly falls out of the QUD framework's own commitment to CI, along with IRIA and IAGA. This should make it our null hypothesis of the QUD framework's subject matter. Any alternative account needs to explain which premise of the derivation goes awry or explain why moving away from the QUD framework's own commitments is beneficial.

Nonetheless, let me gesture at some additional reasons my account is *prima facie* appealing. First, notice that on my account, we can explain why we can model the QUD's effects using *questions*. For questions still play a role in our overall explanation of the QUD's effects. They constitute the content of the interrogative attitude doing the attention-shifting work. Accordingly, it is a harmless shorthand—from the theorist's point of view—to model the QUD's effects in terms of the *question* our interrogative attitudes are directed towards, instead of the zetetic attentional shift our interrogative attitudes cause. Insofar as it's good, all else being equal, to have an account of why our models successfully capture their subject matters, my account thus gets something right in explaining why we can successfully model the QUD's effects using ques-

tions.

Second, notice that on my account, the QUD framework's ubiquity across linguistics and philosophy is easy to explain. Attention is usually thought to play a central role in our cognitive lives (see e.g., Watzl, 2011; Wu, 2011; Jennings, 2012) and in communication more generally (see e.g., Sperber and Wilson, 2001). In turn, curiosity—unlike other mental states, e.g., intentions—provides a resource-efficient way of guiding our attention, as Wojtowicz and Loewenstein (2020) argue. And so assuming that cognitive economy constrains pragmatic phenomena, we would expect zetetic attentional shifts to play a big role in communication. But remember: on my account, these zetetic attentional shifts are modelled by the QUD. Cognitive economy would thus equally lead us to expect that the QUD potentially explains a large host of phenomena. This is what we saw in §2.

Finally, notice that my account does not rely on the now-controversial common knowledge tradition. On this tradition, conversational participants must have common knowledge for a body of information to be public: they must know other conversational participants know that information, know that other conversational participants know that they know that information, and so on.[19] Alas, the notion of common knowledge (and its weaker variants) has recently fallen upon hard times (see e.g., Lederman, 2017, 2018; Harris, 2020b).[20] This has been thought to threaten the existence of the QUD, since common knowledge (or a weaker variant) has usually been assumed to be *necessary* for the existence of a public QUD at all. For instance, Harris (2020b, 2719 (emphases mine)) explicitly assumes as much:

> The question of how the QUD and [Portner (2004)'s To-Do List] are constructed from interlocutors' private mental states is an interesting and open one: neither Roberts, nor Portner, nor (as far as I know) anyone else has articulated reductions of the kind that Stalnaker offers for common ground. **However, for present purposes I will assume that a necessary condition on the QUD or TDL being in a certain state is that the interlocutors commonly accept that it is in that state.**

My account lets us see (i) that a reduction of the QUD can be articulated, (ii) that doing so

[19] This tradition is usually dated back to (Lewis, 1969; Schiffer, 1972). If the version in the text seems too strong, the reader can replace "knows" with "thinks," "believes," or "accepts."

[20] But see Williams (2021) for a defense of common knowledge.

does not require some form of common knowledge. On my view, the QUD's subject matter just is (and thus reduces to) zetetic attentional shifts. But it's standard to think that attention can secure publicity. In particular, *joint* attention—when two subjects attend to some content in lockstep with each other (see Campbell, 2002)—is usually thought to secure publicity without any common knowledge required (Lederman, 2018; Harder, 2022).[21] My account thus lets us say that the QUD is public just in case conversational participants' zetetic attentional shifts are *joint*: they attend to the same answers based on some interrogative attitude they hold. Since joint attention can secure publicity without common knowledge, joint zetetic attentional shifts (and the QUD) can do so too.

Of course, these remarks are schematic. A full defense of my view would require us to compare it to other interpretations of the QUD framework. Let us do that now.

5 Zetetic Attentional Shifts vs. Intentional Attentional Shifts

This section argues that my proposal is better than an alternative, owed to Roberts (2012a, 2017) (see also Beaver et al., 2017; Roberts, 2018). On this alternative view, the QUD models *intentional attentional shifts*—attentional shifts caused by shared communicative intentions.[22]

Let's flesh that out. Roberts thinks the QUD models what Grosz and Sidner (1986) call "attentional states" (see Beaver et al., 2017). As Grodz and Sidner think of them, attentional states model how conversational participants' attention shifts during the course of conversation (Grosz and Sidner, 1986, 6). So, insofar as the QUD models attentional states, it models attentional shifts. Or, as Roberts (2017) puts it (emphases mine):

> *The QUD represents the interlocutors' immediate discourse goal, what the cooperative, competent interlocutor* ***attends to*** *in order to grasp what the speaker means*

[21] Kevin Dorst (p.c.) points out that this will require some complicated iteration principles to capture joint attention's publicity, e.g., that whenever two subjects jointly attend to some information, they jointly attend to the fact that they're jointly attending to that information. Alas, spelling out a logic of attention is well beyond the scope of this paper. So I'll follow most philosophers and psychologists in treating joint attention's publicity as basic.

[22] Exegetical note: Roberts herself (p.c.) thinks that Roberts (2017) contains her views on the QUD framework's psychological underpinnings. Given space constraints, I center my presentation of Roberts's view on this paper, with some other papers mentioned along the way.

> *(aims at), as well as what the competent speaker can take to be the addressee's current focus for the purposes of successful production* (Roberts, 2017, 14).

At this level, there is no difference between Roberts's view and my own. Roberts thinks the QUD models attentional shifts. So do I. Where we differ is in *what* does the attention-shifting work. I think it's interrogative attitudes. She thinks it's shared communicative intentions.

Roberts (2012a) is helpful here. She starts from an intentionalist perspective, on which successful communication involves a hearer recognizing the message a speaker intends to convey.[23] Insofar as intentions play such a role in communication, though, the speaker must be able to reasonably assume that their communicative intentions can be retrieved by the hearer. Otherwise, the speaker's communicative intentions would be *irrational*. For it is irrational to intend to do something (convey a message) if one thinks it can't be done (because the hearer won't decipher the speaker's communicative intentions).

Roberts thinks that discourse structure—in particular, *discourse goals* (see Carlson, 1982)—makes such an assumption reasonable. A speaker can assume that their hearer knows what the shared, intended discourse goals are. After all, they are *shared*, and thus common to every interlocutor. So the speaker can assume that their interlocutor can reason *from* these discourse goals in order to decipher their communicative intentions. The QUD is a way to model these shared discourse goals, and the role they play in enabling and constraining intention recognition. Or, as Roberts (2017) puts it:

> [...] the common ground is a common reservoir of information. Insofar as it purportedly reflects the beliefs of the interlocutors, it should be consistent, as well, and there is now a very large body of experimental work to support the importance of maintenance of the common ground in interlocutor interaction. (Besides

[23] More precisely, she frames things in terms of Grice's criteria for meaning$_{nn}$.

> An utterer U meant$_{nn}$ ψ iff, for some audience A, U uttered a sentence intending (i) to produce a particular response, (ii) for A to recognize that U intends to produce that response, and (iii) for A to fulfill whatever that response requires on the basis of U's intention in (ii).

The details of meaning$_{nn}$ don't matter too much for what follows. As long as the QUD models something that involves shared intentions and intention recognition—which meaning$_{nn}$ does—my objections carry through. I use "communicative intention" throughout for readability.

> the work cited above, see the work of Herb Clark, e.g. Clark 1996.) **Similarly, the interlocutors' mutually evident goals and intentions, including their immediate communicative goals in the discourse interaction as represented by the QUD**, are assumed to be cohesive and organized, in order to more effectively bring about a focus on the relevant content in the common ground, especially that in immediately preceding discourse, in order to facilitate interpretation (Roberts, 2017, 17).

At first, this might seem to contradict what Roberts said earlier. But we can interpret her another way. Since intentions are thought to guide attention (see e.g., Wu, 2011; Carruthers, 2015), we can interpret her as saying that shared communicative intentions—namely, the shared communicative intentions that establish discourse goals—cause attentional shifts. And the QUD models these intentional attentional shifts.

This is the interpretation I'll use moving forward. Again, let's use (1) (presented as (4)) to illustrate how it works.

(4) **A**: What is the best pizza place in North America?

a. **B**: *Papa Ceo's* in Toronto.

b. **C**: *Sal's Pizza* in Milwaukee.

c. **D**: #*Wheaties* is the breakfast of champions.

Here's what Roberts's account has to say. A's utterance introduces a new discourse goal: to figure out the best pizza places in North America. Assuming there is no funny business in the conversation, every conversational participant—A through D—*shares* this intention to figure out North America's best pizza places. This creates an intentional attentional shift: every conversational participant will attend to information relevant to the intended goal of the discourse.

This intentional attentional shift will have interpretative effects. B and C provide information that coheres with this attentional shift and the intention driving it. Hence why their utterances are fine. D does not. Their utterance provides information that has nothing to do with what everyone else is attending to (and what everyone else intends to figure out). Hence why their utterance goes awry. On this picture, then, the QUD models how intentional attentional

shifts create these kinds of interpretative effects. These intentional attentional shifts are the subject matter of the QUD framework.

With Roberts's account in hand, we can start our comparison. In the next sub-section, I'll argue that only my proposal captures the fact that intentions are sufficient, not necessary, to establish a QUD. Afterwards, I'll consider an objection to my view on Roberts's behalf.

5.1 Intentions and the QUD

Recall that my account and Roberts's differ only in terms of what does attention-shifting work. I think it's interrogative attitudes; she thinks it's intentions. Accordingly, we can compare between the two accounts by seeing which mental states can establish a QUD.[24]

On my view, interrogative attitudes do the QUD-establishing work. Intentions are sufficient (if accompanied with an interrogative attitude) but not necessary. For my view says that the QUD just is a way of modelling the interpretative effects interrogative attitudes (and the attentional shifts they cause) have on conversation. In contrast, Roberts predicts that intentions are sufficient *and* necessary to establish a QUD. For her view says that the QUD just is a way of modelling the interpretative effects shared communicative intentions (and the attentional shifts they cause) have on conversation.

Before we look at our cases, one final preliminary is in order. It'll help us to have a diagnostic to test the presence of a QUD. I propose we go with a relatively standard one: the felicity of Focus intonation (see Rooth, 1992). It's usually thought that the QUD determines which parts of a sentence can be Focused (Roberts, 2012b; Beaver and Clark, 2008). Consider:

(5) **A**: What is the best pizza place in North America?

   a. **B**: ***Papa Ceo's*** is the best pizza place in North America.

[24] Author's note: I think there's a deeper motivation. Paul Portner's To-Do List (TDL) also needs a subject matter. I think intentions are much better suited for it, since imperative clauses—which update the TDL—seem to convey a subject's intention-like mental states. Since we don't want the QUD and the TDL to have the same subject matter, we don't want the QUD's subject matter to also involve intentions.

However, arguing as much here would make for a deeply confusing dialectic. So I'm using intuitions about the presence of a QUD as a place-holder.

b. **C**: #*Papa Ceo's* is the best **pizza place** in North America.

(5a) is felicitous. (5b) sounds odd. A common explanation—and one we'll provisionally roll with—is that the Focused element in (5a) answers the QUD. (5b) does not, since it places Focus on *pizza place*, which is not what the QUD is about. So it seems as though Focus intonation is sensitive to the QUD: an element can be Focused only if it answers the QUD.

Time for some cases. Start with the following.

> WHY IS THERE A GOAT HERE? X and Y are watching the NBA preseason. By sheer coincidence, they find themselves watching Warriors - Celtics. And by even greater coincidence, a goat tackles Steph Curry—who happened to be on the bench that day. X and Y intend to deliberate into the following question: *why there is a goat here*? So X and Y start talking about it.

The QUD here is something like "why is there a goat here?" We can use our Focus diagnostic to tell. Suppose the following utterances were made in the context of the case.

(6) a. **X**: The goat is here **because security was taking a nap.**

b. **Y**: #**The goat** is here because security was taking a nap.

X's utterance is felicitious. Y's is not—it rings irrelevant (or at least uninformative) in the context. This is because X places Focus on an element that answers the QUD. Y does not.

This case seems to show that shared communicative intentions are sufficient to establish a QUD. For "why is there a goat here" is the QUD because X and Y jointly *intend* to deliberate and talk about it. Both my account and Roberts's can capture this. My account says that since X and Y are both intentionally deliberating into a question, there will be a zetetic attentional shift. This zetetic attentional shift causes the interrpretative effects on X's and Y's utterances. Meanwhile, Roberts's account says that since X and Y have a shared communicative intention to talk about Steph-tackling goats, there will be an intentional attentional shift. This intentional attentional shift causes the interpretative effects on X's and Y's utterances.

So far so good. But now consider the following case.

WHY IS THERE STILL A GOAT HERE? X and Y are watching the NBA finals. It's game seven, Warriors - Celtics. Right as Steph Curry goes to shoot a potentially game-winning jumper, a goat randomly appears and tackles him. Without looking or talking to each other, both X and Y become curious about the following question: *why is there a goat here*? They then proceed to start talking about it.

The QUD here seems the same as before. Let's use our Focus diagnostic again.

(7) a. **X**: The goat is here **because security was taking a nap.**

b. **Y**: #**The goat** is here because security was taking a nap.

But only my account can capture this case.

Reason: this case can't involve shared communicative intentions. While both parties are interested in the goat, this interest is not coordinated in the way shared intentions need to be (see Bratman, 1993). X and Y both became interested in the question without talking or seeing each other. They couldn't have known—let alone mutually known—that the other person was also curious about why there's a goat in an NBA finals game.[25] And so we have a case in which a QUD is present without shared communicative intentions involved. Since Roberts's view predicts that such intentions are necessary, not just sufficient, to establish a QUD, it can't capture this case.[26]

In contrast, my view has something to say. On my story, shared communicative intentions are not necessary to establish a QUD. Interrogative attitudes are. And we have those here. My view can thus say that *curiosity* is doing the QUD-establishing work in this case. So, it seems my view has greater coverage than Roberts's.

Roberts might worry that the case is mis-described. She might concede that there is a QUD present. But perhaps it is only generated *after* X and Y intend to talk to each other. Roberts's view

[25] I'm using Bratman's account here, on which shared intentions require mutual knowledge. But we could run the explanation with other accounts. For instance, on the story Tenenbaum (2015) considers, X and Y presumably don't start out having an intention to jointly make sense of each other's actions or curiosity. So on that account we still have a QUD without shared intentions.

[26] The reader might worry that the counterexample is gerrymandered. It's not. This kind of case has three structural features: (i) have two or more people simultaneously drawn to a question, for some plausible reason; (ii) block the possibility that their interest in the question is coordinated; (iii) have them talk about the question afterwards. So what we have is a *class* of counterexamples to Roberts's view.

not only can accommodate this; it outright predicts it, since it requires shared communicative intentions for there to be a QUD at all. However, I think this gets the chronology wrong. In this case, the goal to talk about the question "why is there a goat here" is established *before* the conversation begins. For both X and Y independently want to talk about the question, since they're both curious about it. As we just saw, the QUD is meant to be closely related to these kinds of discourse goals. So it is at this time—*before* the conversation actually starts—that the QUD is established. Accordingly, while there might be a shared communicative intention to talk about the QUD, this shared communicative intention isn't doing the QUD-establishing work.

Roberts might also worry about how my view handles cases that don't seem to involve interrogative attitudes at all. It turns out that this worry is potentially fatal. While I think it's solvable, it'll take a few paragraphs. So let us address it in the next sub-section.

5.2 How to Entertain Your QUD

On the story I'm telling, interrogative attitudes are necessary to establish a QUD. Roberts might rightfully note that this seems problematic. It means that my view seemingly can't handle common cases like the following.

> THESIS. J and R are talking about J's thesis topic. J is curious about the question he's writing about. R is not. But she keeps the conversation going because she wants to be a good friend. Due to his curiosity, J contributes utterances only insofar as they relate to the question he's interested in. And due to her cooperativity, R also contributes accordingly. In the end, they move on to discuss much more important matters.

Intuitively, the QUD is something like "what is J's thesis topic?" (Again, the reader is welcome to run our Focus diagnostic). J holds an interrogative attitude. But R seemingly does not. She's just being cooperative by keeping the conversation going. At first glance, my account can't handle this. While there might be an attentional shift here, it seemingly doesn't require an interrogative attitude on R's behalf.

There's a Stalnakerian way out of this worry. Let's think about what Stalnaker (1999, 2014)

calls "acceptance." Sometimes, he thinks about it as a class of belief-like attitudes (e.g., belief, knowledge, supposition, etc.) That's not the notion I'm after. Instead, I'm interested in when he thinks about acceptance as a *sui generis* attitude. On this reading, a subject accepts a proposition just in case she acts *as if* she believes the proposition for some purpose or other. Notice: this is a dispositionalist attitude. To accept a proposition is a matter of being disposed to act as if one believes it (see also Stalnaker, 1984).[27]

However, there's no reason for us to think that acceptance-like attitudes are limited to propositions. Indeed, Roberts herself often talks about a subject "accepting" a question (see Roberts, 1996, 2012b). So let's take Stalnaker's lead. Let us say that a subject *entertains* a question just in case she acts *as if* she's curious about a question for some purpose or other.[28] Again, this is a dispositionalist attitude. To entertain a question is a matter of having the disposition to act as if one is curious about it.[29]

My view can now account for cases like THESIS. We can say that while J is curious about what his thesis topic is, R is *entertaining* this question to be cooperative. Since entertainment is an interrogative attitude—it takes questions as its content, after all—it too can cause a zetetic attentional shift. So it can do QUD-establishing work.

More broadly, we can say that in cases in which a subject *seems* to lack an interrogative attitude, but there's still a QUD, what's happening is that at least one subject is entertaining

[27] If the reader is anything like me, and sympathizes with *representationalism* about propositional attitudes (see e.g., Fodor, 1987), their Behaviorism Alarm should be ringing (see Quilty-Dunn and Mandelbaum, 2018). However, we needn't follow Stalnaker (1984) all the way here in thinking that beliefs or other attitudes are also disposition-based. We might think, for example, that a subject's disposition to act as if she believes a proposition is grounded in an intention to be a cooperative interlocutor—where intentions and beliefs are instead explained in representationalist-friendly terms. Thanks to Sam Berstler (p.c.), Michael Glanzberg (p.c.), and Susanna Siegel (p.c.) for helpful discussion.

[28] This use of "entertainment" differs from Yalcin (2022) in two ways. One, he conceives entertainment as a *class* of attitudes, much in the same way Stalnaker sometimes thinks about acceptance. Two, he conceives entertainment as a class of attitudes that takes *propositons* as its content. I intend it to exclusively take questions as its content. Indeed, I think we're better off positing different acceptance-like attitudes for different content-types. For instance, in the same way a subject accepts a proposition or entertains a question, we might say that a subject *complies with* a plan just in case she acts *as if* she intends that plan for some purpose or other. But that's a topic for a separate paper, so I digress.

[29] Following footnote 27: representationalists like myself can say that the disposition to act as if one is curious is grounded in an intention to be a cooperative inquirer—where, once again, one can explain intentions and curiosity in representationalist-friendly terms. Thanks again to Susanna Siegel (p.c.) for discussion here.

the question at hand. This prediction is tolerable because entertainment seems independently motivated. We feign interest in questions all the time. Examples: parents might act as if they're interested in a question their child is talking about, out of a desire to encourage their child's curiosity. A friend or partner might act as if they're interested in a niche question one is interested in, out of a desire to be supportive. And an employee might act as if they're interested in a question their boss is talking about, out of a desire to remain employed. In all these cases, a subject is disposed to act as if she's curious about a question for some purpose. (Parenting, friendship, and self-preservation, respectively.) Since entertainment is disposition-based, we can say that these cases involve subjects entertaining a question.

6 Conclusion

Okay: so I have argued that the QUD framework needs a subject matter. I defended a proposal—the QUD framework's subject matter is *zetetic attentional shifts*, since (I have argued) these are what the QUD models. Let us now return to the Big Picture. Why does my account show the merits of providing subject matters for our models?

First, it shows why doing so is necessary. As we saw in §2, the QUD framework's explanations were on unstable ground: we didn't know what played the QUD's explanatory roles. §5 showed that Roberts's account made some headway, but ran into counterexamples. My account improves the situation even further. We kept what was right about Roberts's account—appealing to attentional shifts and (sometimes) intentions—while avoiding our initial counterexamples. So, my account better explains what real-world phenomenon plays the QUD's explanatory roles.

Second, it shows how providing a subject matter for our models is valuable. In order to devise my account, we ended up needing to connect the QUD framework with work in the cognitive science (§3) and epistemology (§4) of inquiry. Accordingly, my account shows how our models of communication—the QUD framework, in this case—connect with work in seemingly

unrelated fields. This is a good thing! This kind of unification is usually thought to be one of the goals of science. Moreover, it also means that our models of communication, understood aright, are supported by seemingly unrelated lines of research. Providing subject matters for our models thus gives us good reason to think they are on the right track.

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