The Surprise Quiz Paradox: A Dialogue

Teacher: This week we’re going to have a surprise quiz.

Student: What do you mean?

Teacher: Well, there will be a quiz. And it’s going to be a surprise.

Student: I know what it means that there will be a quiz. But what do you mean in saying that it will be a surprise?

Teacher: The quiz will be a surprise in the sense that you won’t know the day of the quiz in advance. If the quiz happens on any day D, then you won’t know on a day D-1 that the quiz will happen on D.

Student: Interesting. I think this would violate one of my favorite rules about your class. You always say that if we can show a requirement of your class was paradoxical, we wouldn’t have to do it. Your announcement is paradoxical.[[1]](#footnote-1)

Teacher: How so?

Student: It seems like your announcement can’t be true. If it’s true, then the quiz has to happen on either Monday, Tuesday, Wednesday, Thursday, or Friday. I’m going to prove it can’t happen on any of those days and therefore there can be no surprise quiz. I’ll start by proving it can’t happen Friday. Let’s suppose it can happen then and see how that results in absurdity.

Teacher: Ok.

Student: If the quiz happens Friday, then it follows that it hasn’t happened on any previous day.

Teacher: Right.

Student: And if the quiz hasn’t happened by the end of Thursday, then I’ll know it hasn’t happened by the end of Thursday.

Teacher: I can stipulate to that.

Student: Then I know the quiz will happen on Friday.

Teacher: Why would you think that?

Student: Because I know there’s going to be a quiz this week. You just told me that.

Teacher: You said you were going to show that the announcement can’t be true, right?[[2]](#footnote-2)

Student: Right.

Teacher: One thing you might mean by the announcement is just the proposition that: there’s going to be a quiz this week and it’s going to be a surprise to you. If you’re going to prove *that’s* not true, you would show that it’s not true that: there’s going to be a quiz this week and it’s going to be a surprise to you. Or am I missing something?

Student: No. That seems right.

Teacher: And if I follow your argument, you’re assuming there’s going to be a surprise quiz. And that is the main thing you’re assuming.

Student: Right. I assume there’s going to be a quiz which will be a surprise. It gets to be the end of the day Thursday and there hasn’t been a quiz. It follows that there will be a quiz Friday.

Teacher: That’s surely true. If there’s going to be a quiz this week—surprise or not—and there hasn’t been one by the end of Thursday, then it follows that it’s going to happen Friday.

Student: Since there must be a quiz on Friday if there hasn’t been one by the end of Thursday, it follows that I know there will be a quiz Friday.

Teacher: It doesn’t.

Student: Why?

Teacher: Suppose we just *stipulated* that there was going to be a surprise quiz this week. We suppose that is what reality is like as of Monday. We don’t suppose anything about an announcement. I haven’t said anything about a quiz. But there is going to be a surprise quiz this week by Friday.

Student: Ok.

Teacher: Then when we get to the end of Thursday, and there hasn’t been a quiz, it will follow that there will be a quiz Friday.

Student: Right.

Teacher: There *must* be a quiz Friday in that situation.

Student: Right.

Teacher: But it wouldn’t follow in that case that when it gets to the end of Thursday you would *know* that there’s going to be a quiz Friday. You wouldn’t have any idea one way or the other.

Student: Ok. I think I get it. You could just give me a quiz and I might not know anything about it. And it seems like it could be that a quiz is going to happen that I don’t know anything about and as time rolls along that continues to be the case. And I still don’t know anything about the quiz even when there’s only one day for it to happen.

Teacher: Right.

Student: But all of that is irrelevant to our situation, isn’t it?

Teacher: How so?

Student: We’re not just stipulating that there’s going to be a surprise quiz. You started class by announcing a surprise quiz. Therefore, my argument was addressing an *announced* surprise quiz, not an unknown, hypothesized surprise quiz.

Teacher: That’s fair. And I would add that that is a further reason to think your initial argument fails. If there is something incoherent about the announcement of a surprise quiz, surely it has something to do with the fact that it’s an announced *and* surprise quiz. If your argument works the same whether the quiz was announced or not that would suggest you missed the point of what made the original situation problematic.

Student: Agreed. I was trying to prove that an announced surprise quiz couldn’t happen.

Teacher: Now, you can’t mean that it’s not possible for me to announce a surprise quiz, right? Obviously, I was able to do that.

Student: Right, I’m proving that what you said when you announced it can’t be true. And the point when we got hung up was when I said I knew that there was going to be a quiz on Friday if there hadn’t been a quiz by the end of Thursday.

Teacher: Yeah, and I wondered how you would know there is going to be a quiz Friday.

Student: Why can’t I say that I know at the end of Thursday that there’s going to be a quiz Friday because I know on Monday that there’s going to be a quiz?

Teacher: That seems promising to me. Just so we’re clear: the idea is that you know when I make the announcement that you’re going to have a surprise quiz. Is that right?

Student: Right. And if there hasn’t been a quiz by the end of Thursday, I’ll know at that point that there’s going to be a quiz Friday.

Teacher: I could see how that would help your argument. If you knew on Monday that you’re going to have a quiz this week, and you know it hasn’t happened by the end of Thursday, then it seems plausible to say you know the quiz is going to happen Friday.

Student: Exactly.

Teacher: But then you’re giving up on showing the announcement is false, right?

Student: Why would that be?

Teacher: I guess you can think of “the announcement” as either involving your knowing something or not. To me, the truth or falsehood of the announcement doesn’t necessarily have anything to do with your knowing that there’s going to be a quiz. The announcement could be true and you might not hear it, for example. But do you want to build into the argument that because of the announcement you know that there’s going to be a surprise quiz?

Student: I think that’s what the announcement brings with it. If you hadn’t announced the quiz, I wouldn’t know anything about it. There really wouldn’t be any kind of puzzle about whether the surprise quiz could happen if you didn’t announce it. But since you announced it, now I know that there’s going to be a quiz. And yet somehow it’s going to be a surprise to me. That does seem to be paradoxical.

Teacher: Ok.

Student: And the reasoning still starts with ruling out Friday as a potential quiz day and going on to the other days.

Teacher: We can talk about that. But I just want to make clear that I think it seems plausible to me that you do know there’s going to be a surprise quiz this week. At least you know today, on Monday.

Student: Let’s suppose I know today that there’s going to be a quiz this week, but I don’t know in advance what day the quiz will be. Therefore, I know there’s going to be a quiz. If I know that P and Q, it follows that I know P.

Teacher: Right.

Student. And I know that: if the quiz happens on Monday, I don’t know in advance that it happens Monday. And I know that: if the quiz happens Tuesday, I don’t know in advance that the quiz happens Tuesday. And so on for each of the other days.

Teacher: Yeah, right. That follows from what it is for a quiz to be a surprise and from the fact that you know the quiz will be a surprise whenever it happens. And it seems like a plausible principle for these purposes that if you know P and you know that P entails Q then you know Q.

Student: I know all of that. And therefore it’s true. If I know P, then P is true. In other words, if the quiz happens Monday, I don’t know in advance that it happens Monday. If the quiz happens Tuesday, I don’t know in advance that it happens Tuesday. And so on for the other days.

Teacher: Go on.

Student: I think the right way to think about the argument is this. If I know there’s going to be a surprise quiz, then it follows that there will be.

Teacher: Right.

Student: I’m going to prove that assuming I know there’s going to be a surprise quiz, it follows that there can’t be one. And therefore it follows that I can’t know it. I can’t know something that isn’t true.

Teacher: I get your strategy.

Student: I’m not insisting on the argument that there can’t be a surprise quiz. I think you’ve convinced me about that at least for now. But knowing there’s going to be a surprise quiz is a different matter. It’s like the distinction between there being no knowledge and knowing that there’s no knowledge.

Teacher: How’s that?

Student: It seems to me logically possible that no one would know anything. At least I don’t see any reason why things couldn’t turn out that way. But it seems impossible for someone to know that no one knows anything.

Teacher: I think I get it. If someone knows that no one knows anything, then at least that person knows something. And then there is at least some knowledge. And therefore it follows that it’s not true that someone knows that no one knows anything.

Student: Exactly. The situation is similar with the surprise quiz. You’ve convinced me that there could be a quiz that I didn’t know the date of in advance. But once you’ve announced the quiz then it seems like I know there’s going to be a surprise quiz. And I think I can prove a contradiction from that.

Teacher: Let’s hear it.

Student: As I was saying, I’m going to prove that the quiz can’t happen on Monday, Tuesday, etc. And I’m going to start with Friday.

Teacher: Ok.

Student: If the quiz happens Friday, then it hasn’t happened by the end of Thursday.

Teacher: Right.

Student: And if the quiz hasn’t happened by the end of Thursday, then I will know that it hasn’t happened by the end of Thursday.

Teacher: Again, I’ll grant you that.

Student: I’ll still know at that point that there’s going to be a quiz this week.

Teacher: Are you sure?

Student: We’re assuming that I know on Monday that there’s going to be a surprise quiz this week, right?

Teacher: Right.

Student: If I know that on Monday, that must mean I know on Monday there’s going to be a quiz this week.

Teacher: Agreed.

Student: If I know on Monday that there’s going to be a quiz this week, then I must know on Thursday that there’s going to be a quiz this week.

Teacher: That doesn’t follow as a general matter. It definitely can happen that you know something at one time but then don’t know it later.[[3]](#footnote-3) Say you believe that there are an infinite number of prime numbers. Initially you believe that because you understand and can competently replicate the proof that there are an infinite number of primes. So you not only believe there are an infinite primes but know it. Later, you get lazy. You still believe primes are infinite, but you believe it because you see that statement written on a piece of paper lying around your house. You just happen to believe everything written on pieces of paper lying around your house. You knew before that there are an infinite number of primes. But you don’t know it anymore.

Student: Fine. Maybe it’s not true in general that knowledge is guaranteed to survive over time, but it seems like here it does. On Monday I know there’s going to be a quiz based on your saying that there will be one. You are surely an authority on whether there will be a quiz this week. At the end of Thursday I still remember your making the announcement. Although there may be problems with the ability of memory to generate knowledge in some cases, those problems can’t be what will make a difference to whether I can know there will be a surprise quiz this week. Therefore, my memory of the announcement should be as much of a reason for believing there will be a quiz as my initial hearing of it.[[4]](#footnote-4)

Teacher: That makes sense.

Student: Moreover, all that’s changed from Monday to the end of Thursday is that there hasn’t been a quiz yet. I knew Monday that there was going to be a quiz on Monday, or Tuesday, or Wednesday, or Thursday, or Friday. By the end of Thursday, I know there is no quiz Monday, or Tuesday, or Wednesday, or Thursday. Knowing that there hasn’t been a quiz by the end of Thursday is totally consistent with knowing there is going to be a quiz Monday through Friday.

Teacher: Knowing on Thursday that there’ll be a quiz is consistent with all that, but it doesn’t *follow* from knowing on Monday that there’ll be a quiz and the rest. As far as your argument goes you could know on Monday that there will be a quiz but not know at the end of Thursday that there will be a quiz. You said you were going to prove that it’s not *possible* for you to know there’s going to be a surprise quiz. I assumed that meant you would deduce from some agreed premises that some further contradictory propositions would follow. It’s not enough for you to convince me that there are propositions that are consistent with the initial assumptions that suggest in many cases knowledge of a surprise quiz doesn’t happen.

Student: I agree that my goal was to prove that knowledge of a surprise quiz is impossible. And I did think I would be able to demonstrate a contradiction on the basis of agreed premises. And I was thinking that demonstration meant that the denial of the consequence was impossible. Still, even if you can consistently deny I know there will be a quiz on Thursday given all we’ve agreed to, isn’t it intuitively very compelling to say I do know on Thursday that there’ll be a quiz this week? And therefore I’ll know that there’s going to be a quiz Friday?

Teacher: I think that’s right. At least as far as the considerations you’ve mentioned so far, I think it is compelling to infer you would know at the end of Thursday that there’s going to be a quiz Friday. Suppose all I’d said was that there was going to be a quiz this week. Then I would also think you’d know there was going to be a quiz this week. And let’s say we get to the end of Thursday and you haven’t had the quiz. It seems plausible that you’d still know at that point that you’re going to have a quiz. And therefore I think you’d know there’s going to be a quiz on Friday.

Student: Right. Therefore, this retention of knowledge business isn’t your real beef. It sounds like you think I could and would retain my knowledge that there’ll be a quiz from the considerations we’ve talked about.

Teacher: Yeah, but keep going with your argument and I’ll explain where I think it goes wrong.

Student: Well, I was about to say that since I know there’s going to be a quiz on Friday, it follows that Friday can’t be the surprise quiz day. That’s because we stipulated that the quiz would be a surprise in the sense that I wouldn’t know in advance what day it would be. But I’ve just shown that I would know at the end of Thursday that the quiz will be on Friday. And therefore Friday can’t be a day when the quiz will happen *and* be a surprise.

Teacher: Let me just go back a bit and note that when we first took a stab at the argument, we were looking at what would happen if you got to the end of Thursday and there hadn’t been a quiz yet. You said you would know there was going to be a quiz Friday.

Student: Right.

Teacher: I think we agreed that once we clarified the situation we hadn’t identified anything that guaranteed you knowledge that you would have a quiz Friday. To rectify that situation, we found something that would at least help give you knowledge. We assumed that on Monday you would *know* you’re going to have a surprise quiz this week. And then that’s what we’ve been discussing.

Student: Right.

Teacher: In considering what you know at the end of Thursday, you have to consider everything we’ve said you know, not just the part about knowing there’s going to be a quiz.

Student: I don’t follow.

Teacher: On Monday, you didn’t just know that there was going to be a quiz, you knew that there was going to be a *surprise* quiz.

Student: Yeah, so?

Teacher: So that means on Monday you knew that whatever day the quiz happens you will not know in advance the quiz will happen that day.

Student: Right.

Teacher: And we agreed earlier that if you know a thing will happen then it will happen. If you know there will be a quiz, then there will be a quiz. Therefore, if you know the quiz will be a surprise then it will be a surprise.

Student: I agree with all that.

Teacher: Since there will be a surprise quiz this week, that means that you don’t know in advance the day of the quiz. For example, on Thursday you don’t know there will be a quiz on Friday. That is a fact about the state of your knowledge on Thursday. If you are considering what you know on Thursday, you have to take that fact into account as well.

Student: Is your point then that I don’t know on Thursday there’s going to be a quiz on Friday?

Teacher: That does seem to follow.

Student: But you seemed pretty convinced that at the end of Thursday I would know there’s going to be a quiz on Friday.

Teacher: I was trying to be cagey, but maybe that wasn’t obvious. What I believe is that just restricting yourself to the knowledge that there’ll be a quiz and the passage of four days without a quiz, it does seem plausible to me that you still know that there’s going to be a quiz, and therefore you know that there’ll be a quiz on Friday.

Student: Right.

Teacher: But we’ve seen that’s not all that’s going on at the end of Thursday with respect to your state of knowledge. In fact, at the end of Thursday you at least *also don’t* know there’s going to be a quiz on Friday. We’ve seen that follows from your assumption of what you knew on Monday.

Student: Why can’t I take that seeming contradiction on happily?

Teacher: How so?

Student: My idea was to prove a contradiction from the assumption that I know there will be a surprise quiz.

Teacher: Right.

Student: And I’ve shown a contradiction follows. Assume I know on Monday that there will be a surprise quiz this week. Then it follows that at the end of Thursday I know there will be a quiz Friday. Maybe you’re right that I also *don’t* know there will be a quiz Friday. That’s all the better for me and all the worse for you. It proves that the scenario I wanted to show leads to absurdity does in fact lead to absurdity.

Teacher: That’s clever. I think that would show that you couldn’t know on Monday that there was going to be a surprise quiz, and then no quiz happen by the end of Thursday. Maybe the quiz could still happen on Monday, Tuesday, Wednesday, or Thursday.

Student: Are you finally ready for me to explain why, assuming I know the quiz is going to happen, it also follows that the quiz can’t happen on Monday, Tuesday, Wednesday, or Thursday?

Teacher: I’m afraid not. I don’t think you have shown a contradiction about what would be going on at the end of Thursday.

Student: How’s that?

Teacher: The supposed contradiction is that if there hasn’t been a quiz by the end of Thursday you both know and don’t know that there’s going to be a quiz Friday.

Student: Right.

Teacher: I agree that you don’t know there’s going to be a quiz Friday at that point. But the crux of your argument is that you know there’s going to be a quiz on Friday.

Student: That’s fair.

Teacher: When you consider what you’re going to know at the end of Thursday you have to take into account all of your relevant circumstances. You knew on Monday that there was going to be a surprise quiz. You know at the end of Thursday that there hasn’t been a quiz. In fact, you don’t know at the end of Thursday that there’s going to be a quiz on Friday.

Student: Right, but I also surely still know there’s going to be quiz.

Teacher: If you think your knowledge that there’s going to be a quiz is going to survive in these circumstances shouldn’t your knowledge that it’s going to be a surprise also survive? And so it would follow that on Thursday you don’t know there’s going to be a quiz on Friday.

Student: Maybe, but that’s still not going to help you.

Teacher: How so?

Student: I could happily agree with that and that would get us to where we were a minute ago. I know on Monday there’s going to be a quiz, which knowledge survives to the end of Thursday. I know on Monday the quiz is going to be a surprise, which knowledge survives to the end of Thursday. Then, assuming basic principles of how knowledge works, it would follow that on Thursday I know the quiz is on Friday *and* I *don’t* know the quiz is on Friday. And I don’t mind knowing that, even though it is impossible. I’m fine with my supposed knowledge of a surprise quiz yielding even more impossibility. It just goes to show that I can’t know there will be a surprise quiz.

Teacher: Clever again.

Student: The crux of the matter is whether I know there’s going to be a quiz on Friday. I think our discussion has clarified that to know that I need to know at the end of Thursday that there’s going to be a quiz.

Teacher: Yeah, and you have not demonstrated that your knowledge that there will be a quiz *must* survive until the end of Thursday if the week has gone by quiz-less. Rather than insisting that there will be a quiz this week and that there will be a quiz Friday, it seems like the rational thing for you to do at the end of Thursday is to recognize the limits of your knowledge and suspend judgment about the occurrence of a quiz Friday.

Student: But couldn’t I have some reason to think at the end of Thursday the quiz will still happen but presumably it won’t be a surprise? Maybe that’s just how the class works. Every week each student in the class gets a grade and the grade is always based on a quiz. Therefore, if I get to the end of Thursday without a quiz I’ll infer that there is going to be a quiz, but you’ve decided not to make it a surprise.[[5]](#footnote-5)

Teacher: Interesting.

Student: Also, what if I think about the Thursday situation this way? When you said there was going to be a surprise quiz, the idea was to get us to prepare for a quiz. That’s why you wanted to make it a surprise. That way we’ll study the material each day in case the quiz happens the next day. When I get to the end of Thursday, the reasonable thing for me to think is that you’re still going to give the quiz. What would be the point of all the preparation and then not having a quiz? And then it’ll be reasonable for me to infer that there’ll be a quiz on Friday. And then I’ll know that there’s going to be a quiz on Friday. And therefore, I will have ruled out a Friday surprise quiz.[[6]](#footnote-6)

Teacher: One problem with this proposal is that it doesn’t address other announced surprise situations. It seems like the same riddle arises with announced surprise air drills, hangings, and the like. Reasoning that moves us forward in considering the puzzle in the quiz context should be equally applicable to all these cases. It’s hard to see what studying someone will do to get ready for a surprise hanging. Or what is the pedagogical benefit to keeping a hanging a surprise.

Student: That’s true, I guess.

Teacher: But there’s a deeper problem with either suggestion on which you still know there’s going to be a quiz on Thursday where you find some way to discount the possibility that the quiz will be a surprise. The problem is that the quiz will still in fact be a surprise.

Student: What do you mean?

Teacher: From your knowledge on Monday that the quiz will be a surprise it follows that in fact at the end of Thursday, you won’t know there’s going to be a quiz on Friday.

Student: Ok.

Teacher: Suppose I grant that at the end of Thursday you know there’s going to be a quiz. And you know it hasn’t happened it. You infer that the quiz is going to be on Friday. The question then is whether you know there will be a quiz Friday. There is a fact that defeats your warrant for your belief that there will be a quiz Friday. This is like those Gettier examples we’ve talked about.[[7]](#footnote-7)

Student: Can you remind me?

Teacher: Here’s one. Say you’re driving through the countryside in Wisconsin.[[8]](#footnote-8) You look up from the road and notice a barn, forming the belief that there is a barn over there. It is a barn. But it so happens that this is fake barn country. The real barn you see is the one genuine article among a thousand fakes. You are justified in believing that there is a real barn over there. But you don’t know. You got lucky. The situation with your belief at the end of Thursday about the Friday quiz is similar.

Student: How so?

Teacher: Setting aside the fact that at the end of Thursday you don’t know there’s going to be a quiz Friday, there’s a lot going for your belief that there’s going to be a quiz Friday. You know on Monday that the quiz is going to happen on Monday, Tuesday, Wednesday, Thursday, or Friday. You know on Thursday it hasn’t happened on Monday through Thursday. It sure seems to follow that, given that you believe it on Thursday, that you know there is going to be a quiz Friday. But your ignorance that there will be a quiz on Friday defeats the warrant for your belief. One way to think about that is that if you added your lack of knowledge about a quiz Friday to the rest of what you know, it would be clear that you don’t know there is going to be a quiz on Friday. That is, if you knew that you didn’t know there was going to be a quiz Friday, you would refrain from asserting that you do know there will be a quiz Friday.

Student: That seems to follow. But I want to shift gears. You’ve been insisting on whether my knowledge of a quiz on Monday does or does not survive until the end of Thursday. But I think this temporal retention of knowledge isn’t relevant to the core of the puzzle.

Teacher: How’s that?

Student: Here’s a scenario where the same paradox arises but retention of knowledge is not relevant. Suppose you still announce a quiz but announce a different process for determining who will take it and what makes it a surprise.[[9]](#footnote-9) Instead of five days in which a quiz can take place, let’s suppose there are five students who are potential candidates to take a quiz. Call these students Monday, Tuesday, Wednesday, Thursday, and Friday. Only one of them will take the quiz. The process leading up to the quiz involves the students’ being lined us up so that Friday can see the backs of Monday through Thursday in front of him but not his own. Thursday can see the backs of Wednesday through Monday in front of him and not his own. And so on, with Monday not able to see anyone’s back.

Teacher: Got it so far.

Student: You tell us that you’ve placed a silver star on the back of each student who’s not taking a quiz. And you say that you’ve placed a gold star on the back of the student who is going to take the quiz. And you announce that the quiz will be a surprise in the sense that the student who is taking the quiz won’t know that he’s going to take the quiz just based on what he sees when the students are lined up, plus what you’ve told us, plus what he can deduce logically from these assumptions.

Teacher: Ok.

Student: The idea is that the paradox arises here even without considering whether knowledge is retained over time. Because the retention of knowledge over time is not relevant, I’ll call it a “static quiz scenario” in contrast to a “dynamic quiz scenario.” And let’s call the student who will take the quiz the designated student.

Teacher: Let’s hear it.

Student: We’ve been talking about two kinds of situations involving a surprise quiz, so I should begin by clarifying which situation will apply to the static quiz setup. In one case, we were considering whether it was possible for there to be a surprise quiz. And in the other case, we were considering whether it was possible for me to know that there was going to be a surprise quiz. Since the knowledge retention principle arose in the context of whether I could know there will be a surprise quiz, I will consider whether it can be known that there will be a surprise quiz in the static situation.

Teacher: Ok.

Student: The question is whether it’s possible for one of the students to know there will be a surprise quiz in the static scenario. I’ll adopt a similar approach and rule out each student one by one. I’ll start with Friday. If Friday knows that one of the students will have a surprise quiz, then he knows that either Monday, Tuesday, Wednesday, Thursday, or Friday has a gold star on his back. And Friday knows that whoever has the gold star on his back does not know that fact just based on what he sees.

Teacher: Right. I would say it seems like Friday could know that. For example, Friday might know that and see a gold star on Tuesday’s back. In that case, it seems that Friday knows someone is the designated student, sees that Tuesday is the designated student, and Tuesday doesn’t know that he’s the designated student.

Student: Appearances can be deceiving. I’ll prove that Friday can’t know someone is the designated student and I’ll start in the same way that I started with the dynamic quiz situation. Suppose Friday knows someone is the designated student and then I’ll exclude potential designated students one by one.

Teacher: Ok.

Student: I’ll start with Friday as the designated student. We assume for reductio again that Friday knows someone is the designated student and knows that that person doesn’t know he is taking the quiz. It’s possible for Friday to look up and see that Monday through Thursday have silver stars on their backs. In other words, it’s possible for Friday to both know that one of the students is the designated student and also know that Monday through Thursday have silver stars on their back. But then if he knows all that it follows that he knows he is the one with the gold star on his back. And therefore it will follow that he can’t be the one with the gold star on his back since the student with the gold star on his back *doesn’t* know that he has a gold star on his back. So we have ruled out Friday as the designated student.

Teacher: That’s clever, but I think what drives the argument is still the assumption that knowledge is retained over time.

Student: How so?

Teacher: Let’s back up. What drives the interest in the initial situation is that it seems possible for a surprise quiz to happen; and it seems possible for a student to know that he’ll have a surprise quiz. And yet your simple argument seems to challenge those assumptions. What’s the analogous intuitive assumption in the static situation?

Student: It’s plausible to suppose each student knows one of them is the designated student but that the designated student doesn’t know he is the designated student. And as we said, whether someone is the designated student is a function of knowing you have a gold star on your back just based on what you see in front of you.

Teacher: It does seem plausible that each of the students might know that. And your argument asserts that Friday can’t know that and also know that the students in front of him all have silver stars on his back. The assumption is that Friday knows one of them is the designated student and then comes to know that all the students in front of him have silver stars on his back. The one bit of knowledge happens before the other. This is not a case of static knowledge but dynamic knowledge like before.

Student: Walk me through this.

Teacher: Friday knows that one of the students has a gold star on his back but (that student) doesn’t know he has a gold star on his back just based on what he sees in front of him. I think that’s true and you are trying to show that’s impossible. Right?

Student: Right.

Teacher: You ask me to consider the situation where Friday knows that all the students in front of him have silver stars on his back. And I would say that is possible as well. I see no reason why Friday couldn’t know that all the students in front of him have silver stars on his back.

Student: It sounds like there’s no disagreement between us yet.

Teacher: But your argument requires that when Friday knows that no student in front him has a gold star on his back, he *still* knows that one of them is the designated student. That is how he is supposed to put two and two together and infer that he must be the designated student. You imagine that Friday sees that no student in front of him has a gold star. He knows—still knows—that one of the students has a gold star on his back. And he deduces that he must be the one with the gold star on his back. But then I can resist your argument by remembering that knowing isn’t automatically preserved over time. And I ask again why Friday must continue to know that one of the students has a gold star on his back after he comes to know that none of the students in front of him has a gold star on his back.

Student: Let’s say I agree with that. Let’s go back to the dynamic surprise quiz situation. You keep insisting that I don’t know there’ll be a quiz Friday. What do you say I know at the end of Thursday when it arrives quizless?

Teacher: As far as the puzzle is concerned, what follows are facts about what you don’t know: specifically, you don’t know there is going to be a surprise quiz and you don’t know there will be a quiz on Friday. There is nothing non-trivial that follows about what you know. As I said earlier, the rational attitude for you at the end of Thursday is to refrain from judging that you know that there will be a quiz on Friday.[[10]](#footnote-10) And of course you should also refrain from judging that you know that there will not be a quiz on Friday, since there will be a quiz.

Student: That is strange. According to you, if there is no quiz by the end of Thursday, I don’t know there’s going to be a quiz Friday. Does that mean you wouldn’t know either?

Teacher: I don’t see why it would. The facts we’ve assumed to be going on implicate your knowledge and lack of knowledge fundamentally differently than they implicate mine. We’ve stipulated facts from which it follows that you don’t know that there is a quiz on Friday. Those facts imply that *you* don’t know there is a quiz Friday; they don’t imply that *I* don’t know. I think we can safely suppose I also know on Monday that there’s going to be a surprise quiz. But the quiz is not a surprise *to* *me*. It’s a surprise *to* *you*. Therefore, there is no obstacle to my knowing at the end of Thursday that there’s going to be a quiz Friday. You have a blindspot[[11]](#footnote-11) about a quiz happening Friday; I don’t.

Student: Doesn’t that seem counterintuitive?

Teacher: I honestly don’t see why. What different people can know about something depends on the facts, including facts about them. If the facts about some people prevent them from knowing something, then just in virtue of those facts those people will not know the thing.

Student: I think I’m convinced that you wouldn’t be breaking any class rules by having a surprise quiz or by me knowing about it.

Teacher: Good. You passed.

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1. For an early discussion, see D. J. O’Connor, (1948). [↑](#footnote-ref-1)
2. See Weber 2015: 283; Immerman 2017: 4583. [↑](#footnote-ref-2)
3. Kripke, (2011: 35-36). [↑](#footnote-ref-3)
4. Wright and Sudbury (1977). [↑](#footnote-ref-4)
5. Kripke, p. 36. [↑](#footnote-ref-5)
6. Weber (2016: 293-94). [↑](#footnote-ref-6)
7. Gettier 1963. [↑](#footnote-ref-7)
8. Goldman (1976). [↑](#footnote-ref-8)
9. Sorenson 1988: 317-18. [↑](#footnote-ref-9)
10. Quine 1953. [↑](#footnote-ref-10)
11. Sorensen 1988 328-29. [↑](#footnote-ref-11)