# Transcript – Part 1

Interviewer

So this is the interview recording for participant one for the exit interview, and will be transcribed later on and deleted. So we'll first just begin by talking about last week, or the past week rather. How was interacting with the object in the past week. Was there anything you liked about it or disliked about it?

Participant

Yeah so, it was fine to interact with it. It was slightly frustrating because I didn't have enough feedback from the app from if I actually succeed in authenticating myself. So I don't know how many successful authentications I performed during the last week. From the process itself, I didn't have a chance to authenticate on the go while I was standing up so I was always somewhere where I had the table, so I put the phone down on the table and like prepared the object in my hand, the face as it's supposed to be in, set it down, turned and set it down again so I don't know how well that would perform if I held the phone in hand instead of just setting it down on the table.

Yeah, it was not necessarily by design that I avoided authenticating while holding phone in hand, because it just like didn't come up while I was somewhere out and about or when it came up somewhere when I was out and about, I was like running late and couldn't be bothered to stop and do the task.

Interviewer

Yes, I think in in general, you know, if you're authenticating usually you'll be doing it somewhere convenient anyway, so. But those make sense. All of the authentications were done, just sort of flat on the table. Was there anything in particular that went wrong when you tried to authenticate?

Participant

I think few times I clicked the screen with my finger in addition to the object, but it didn't come up very often. As said previously, I don't really know which times went well, which ones failed, but I had the feeling that I maybe placed the object one side at a time, so not like full on like slightly offset and maybe that triggered a few points before triggering the other ones and that messed up the input. Other than that, nothing really went wrong.

Interviewer

Just going back to the accidentally touching the screen. Would you say that that when it happened, would that be a big problem? Like something you absolutely notice every single time or?

Participant

I would definitely notice that I do it, because you can really feel when your finger touches the screen and I think that's something that would become better with my routine because I just would develop a way to grip it reliably so as not to touch screen with fingers.

Interviewer

So that's something you think you could sort of learn to not do essentially.

Participant

Yeah.

Interviewer

Uhm, was there anything that prevented you from using the item?

Participant

Well, sometimes I didn't have it at hand. It was mostly just at home and I was, yeah, sitting in the living room and the object was on the table in the in the office and I couldn't be bothered to walk over and fetch it. But other times I had managed to not forget it. Now the one time I came close to forgetting it, but I remembered when I was just about to leave and grabbed it last minute.

Interviewer

Yeah, yeah so. What do you think about the shape of this and the size of the item?

Participant

Well, it was convenient enough for me to carry around with me. I usually wear like starting jeans, pants and they have like this historical small pocket inside the pocket and the cube I have here fitted in there rather nicely, it wasn't the most convenient thing, but it didn't bother me really, so just made pulling out my wallet bit trickier, but it was mostly OK. I mean, it's a completely detached object, so I really have to establish a routine to remember to take it with me alongside my phone and keys and wallet and whatever. But that was, at least for me, easy enough, although I said one time. I mentioned almost forget it while I was still OK with taking my phone and keys and wallet with me.

Interviewer

So would it be correct to say that it did get in the way a little?

Participant

A bit, but not too too much.

Interviewer

Yeah yeah, let's see. And do you think it would be maybe easier to carry around and remember if you could attach it to something, say like a key ring or something?

Participant

Yeah, I think if that was attached in the key ring, I don't know if it would make it easier. Would be bulking point in the pocket. But yeah, it definitely wouldn't run the risk of forgetting.

Interviewer

So if the item was a commercial product would you ever consider buying it?

Participant

This one, I mean I would consider but I don't think I would end up buying it. At least not after testing it for a week. Although I mean OK, I was still kind of thinking about this thing attached to the key ring. I think without having it attached to the key ring it's less bulky, so I think I would maybe consider buying it or more. Much of my experience was coloured by like the, lack of response, and of course that's part of the study because. I would always get like at least the response if I got into the application I was trying to authenticate with, even if before that I don't have like response for the single interactions. So it's a bit hard for me to judge how I would find this thing in like a real world scenario, right?

Interviewer

Uh, is there any sort of particular points that would stand out to you as to why you know you wouldn't choose the object?

Participant

Well it is more cumbersome than not at all and the interaction, at least with a quite unresponsive authentication app, is still quite frustrating. Yeah, but no sorry, cumbersome, but will be frustrating because like I mean, after what over 10, 15 years of smartphones? I and I think most other people got pretty good feeling intuition about when the touch was registered and whatnot. And usually the apps and the phone's has quite a good feedback with vibration and slight noise. And, well, actually something happening on the screen. Whether the click is registered and not, or like some bit of plastic in between, it's quite hard to judge if you're actually making proper interaction with the screen.

Interviewer

So it's almost like maybe if you used as an authentication method you would prefer something more concrete, or for response, you know, maybe a vibration when you touched it to the screen or something.

Participant

Yeah, vibration or like just like small flashes on the screen something like that and I also feel like maybe interaction method where I can set the object down on the screen and then manipulate it without lifting it off would be better because then I just establish contact ones, know that OK the thing has contact and then can do my manipulations without worrying about lifting it off and setting down properly again whatever.

Interviewer

So you thought the method was a bit fiddly essentially.

Participant

Yeah, at least in conjunction with this whole unresponsiveness thing. I mean, theoretically, maybe it's not so much default of the object as much as default of how I chose to use it, because thinking about it now, I chose to grip it the way I want it, like with the contact on some of the exposed faces and then setting it down with the correct face down, but I would also just like put it down without touching the contact surfaces and then touching contact surface, so theoretically that would be possible. Yeah, but I didn't try that one out. Didn't think about it.

Interviewer

So I think that's everything for the interactions of the last week. I'd also like to get your opinions on some other two factor authentication methods, in a general sense, you know, you're familiar with and such, so. Are you familiar with using other two factor authentication methods for banking parts or other services, for example?

Participant

Yeah, I most often use a one time pad app, the Authy app specifically and I use it almost daily because I need that to get like access to AWS at work and it's usually just like a step when starting work first thing in the morning, pull the phone out to get the one time pattern. Get the AWS access. So that was kind of interesting, that with the study app, it usually give me like a note at about the same time I would usually authenticate for AWS and that kind of help rather similar in terms of how cumbersome it was because, OK. I need to pull my phone out and do a thing on that and that felt quite comparable there.

Interviewer

Perfect. And so I suppose the most important question now, would you prefer to use this method over other two factor authentication methods?

Participant

I mean just from the interaction [with this study]. Well, of course not in this state that it's now in the study, but I can see where it's going and that it could really be a proper competitor to for example, the one time pad. Of course, there's like one more thing that I have to think about carrying with me and forgetting and the interaction is well, at least different, because it would be one time, but I still have to take my phone and enter it into my computer into my laptop here. I don't need to interact with my laptop, but I need to interact with the model and. Yeah, manipulated. I mean, I would roughly know what's the background of the security here. What the rough method of working for those these things are, so I feel that's a bit better than the content products. I mean, I would still be reliant on having network because, but that's just like OK, I want to have access to some network service, so of course I need network kind of neither here nor there with the items or the two factor authentication method. Yeah, I would definitely consider using like a more mature version of the 3D auth for actual day-to-day application.

Interviewer

So it would be fair to say in the future, you could possibly consider it, but it's current state. That's not quite there.

Participant

Yeah, definitely.

Interviewer

OK, that makes sense. So how secure does it actually feel to use the item for the authentication?

Participant

Well with the cube. So the die, I kind of felt that I could be shoulder surfed. More or less easily, especially because I was setting it down on the table and like you could really see it from all sides. What I was doing. I mean probably it would be a bit better if I hold held it in my hand, especially if I like obscured all the faces. But the way I was using it, I it felt quite vulnerable to shoulder surfing. Now, of course somebody would need to steal the item. So that's still like a thing. I didn't leave the item out on a tabletop at work or something like that. So I always carried it with me, probably not that much danger of getting it stolen. It's not more than like having my keys stolen or something like that. I don't know. The one time pad apps are of course kind of vague. You get this number shown. It's coming from somewhere and for some reason that that authenticates you. This one, I mean, you kinda have something physical to wield and to touch. No, no, it's. It's maybe a bit easier to understand from technical standpoint, at least for me, but I'm also in software engineering so. Yeah, difficult to tell how secure or insecure it felt, especially compared with what's currently on the market.

Interviewer

OK. So if you if you were to use this kind of authentication methods and these kinds of objects, what services would you consider using them for in your daily life?

Participant

Well, I think the AWS access at work. I would pretty much yeah consider using it, no problem there. Maybe for banking? I know currently I don't think I have two factor authentication for most banking apps and I just have like a single password there. Yep, probably would consider using it for that. Using it for banking would depend on me using it for something I need daily because if I just use it for banking then I think I have a higher risk of not having it with me when I need it and if I use it for something like this at work then yeah, I carry it with me every day and then it's fine if I need to use it for banking transactions like every fortnight or something like that. And it's with me per default.

Interviewer

So if you were to use them, you would prefer to use them for, say, multiple services at a time.

Participant

Yeah, I wouldn't like having one object for each service and using, that would get out of hand quite quickly, and the one time pad app is just one app for each service, but I theoretically have it set up for five service in total and even just having one object for each of that will be a bit much.

Interviewer

Right, that make sense. So which devices, as well, would you consider using this type of authentication?

Participant

Probably just my smartphone. But that's also the only touchscreen device I own, so I don't have like a tablet, but directly. If I had a tablet, I would use it there as well, but at least I don't consider a tablet a different devices from smartphones just like big smartphone from so. But yeah, I don't think I would use it in little laptop, but I don't see how it would work on the laptop with lack of widespread touchscreens there? I mean, sure we have like fancy lenovos. But I don't have a fancy Lenovo, no touchscreen, not necessarily need one. Like those laptops that you could fold them around to a basically a tablet. Home computer is still, I have a desktop computer, so I have the same thing there, not touch sensor.

Interviewer

Assuming you did have touch sensors on other on other devices, would you maybe use it there as well?

Participant

Well, I if I had touch sensors anyways, yeah sure would use but if I had to buy like a seperate touch sensor just to use it, I wouldn't.

Interviewer

So you would only really use it for devices with built in touch sensors essentially. OK, I see.

Participant

Yeah, so maybe if in future. They just come with touch screens per default instead of just in luxury grade models. Or if our devices have like just a small touchpad for things like that built in. Anyways, yeah, sure. No problem there.

Interviewer

Right? I think that's everything for this part of the recorded interview, so I'm I'm going to stop it just here.

# Transcript – Part 2

Interviewer

So this is again participant one and this is part 2 of the interview after having looked at all the models during the study. Of course, you only had one object, but there were multiple objects available and you've just had the chance to have a look at all three. So having had this chance, which would you have preferred to use?

Participant

I mean. Well, the credit card was a bit inconsistent, but in general I think I would prefer it, I mean I can check one more thing and it's like, I have one of those old man phone cases that have like a place for credit cards that fits in there so I don't even have to put it in my wallet. I can carry it with my in my phone case, which would be quite convenient. So neither do I run chance of forgetting it. Or I mean if I forget and then I forgot my phone then it doesn't matter if I forgot model. And it's yeah, it's not like cumbersome or pointy in the pocket, like the cube was. Yeah, of course, like the study model works a bit inconsistently, I think I would have preferred as interaction instead of drawing the pattern and then pressing the last button, the footprints I would say, I would prefer to hold it on the footprint because it's also nice and central, and then draw the pattern. I think it would give it like a nice secure hold on the screen and then I can do the interaction without worrying about slipping. But now I have to worry about it slipping because I only hold it by a corner. You have to do in the interaction and then you have to interact with the footprint, which kind of gets in the way with the finger I'm holding it with. But I think in general the credit card seems quite nice. It has also the advantage over the cube that I have the interaction to that one that I place it down then I know the contact is there and then I just have to interact instead of like taking it off and putting it down and taking off and putting down different way. Although as I said before, I mean, theoretically, I could have done it with the cube as well, so that's my mistake. About the key lock, I don't know how I would compare it to the cube, but I think I would definitely prefer the credit card over it because, I think It's less pointing, less bulky than the cube to carry it in the pocket. But I would be hesitant to have it in there because it's still bulky, bit too awkward, to just carry it around in keychain, although like just slightly so I think I would probably be fine with that and people with like bigger pockets even more so. I would be afraid to break it because it has moving parts so the cube felt quite solid and secure. I had no worries that it will break on me, but this one I would worry that the moving parts come apart or like the or how do you say like the action gets loose and I lose contact inside of the object or something like that? And also probably if I have actually have it on my key ring so I get my keys out and imagine that I actually have it fixed on that. And I would need to hold the keys while trying with the object. Which feels quite awkward. Plus, I mean, yeah, that's tough plastic, but I wouldn't like to find out how it behaves after like a month or year in the pocket with hard keys like so proper hard metal. But I mean OK, I also have like key Pops. They're also plastic and they seem to be fine, so probably on that point that's fine. But yeah, still because of the other reasons I would prefer something like the key card. Oh yeah, and also like again similar to [pendant model], it seems to be expecting like a single patterns interaction so it triggered, I think a failed authentication is just scripted by the centre point and I would kind of expect that if I have like a point that I always have to interact with that does the footprint that I can just hold it there and just the footprint won't trigger an interaction or won't register an authentication attempt then, and if I do the interaction then it sees if the overall foot or the overall pattern is the correct one. But that's more on the software side. Hasn't really anything to do with the model itself. Yeah, so yeah, credit card first.

Interviewer

So for the pendant you sort of think it feels a bit fragile and?

Participant

Definitely more fragile than the other objects, just on the account of it having moving parts.

Interviewer

OK. And so for the interaction with the credit card you think it would be better if the footprint part was something that you made continuous contact with while you're doing authentication.

Participant

Yeah exactly, it's the same for the pendant as well. I. I think that for.

Interviewer

Yeah, that too.

Participant

Me, at least that's, is a more profitable direction in general, especially if you need to establish like firm contact and prevent the object from slipping through. Being as just hold it with one hand and then interact with the other

Interviewer

So you think it would maybe feel better if you were using models like these. If while you were doing the authentication there was some point of contact that you were sort of that supposed to hold essentially?

Participant

Yeah, then that point of contact can also be like strategically placed that that's comfortable to hold it in securely hold it there.

Interviewer

Yeah, something sort of unambiguous. OK, I see. For the credit card, you mentioned that the shape is a lot more convenient than the than the die. And the pendant. I think it was sort of a very similar shape. But you mentioned that the die was sort of pointy. In in terms of shape do you think it would be more convenient to carry around the pendant than the die?

Participant

Well, it depends. It would be definitely more convenient to carry the pendant around as a keychain. In general, I think it doesn't make much difference between the dependent and the die if it's not a key chain. Why I am, why am I saying that it's because back again to like the wee pocket that you've got in the jeans? The die fits in there quite nicely. I can have it like with the flat side against my body and then it doesn't really matter that it's pointing. Same thing with the pendant like if I shoved in the same pocket, I assume at least. That's right, and yeah, I put it through the flat side. So with the button in there that's fine. But if I have it as an actual pendant as a key ring, then they can go into the pocket with whatever orientation. And then if that ends up pointy edge towards my body, that's quite uncomfortable. With the pendant. Yeah, you have like still a sharp ish edge. But you don't have like such an aggressive point as you would with the die.

Interviewer

And in terms of the interactions that you do with these specific objects, which one was your favourite?

Participant

I think the credit card, like just the action of swiping, a pattern is quite, yeah, it feels quite nice. I mean I also used a like swipe pattern just for normal phone unlocking for some time. I don't use it currently because as far as I understand that's not super secure because it needs some very easy, easily readable trace and doesn't have like password, space or whatever, but in general like just from the feel of it, I preferred that one, like always in the credit card kind of gives like a very similar feeling, just draw around the clock. It's kind of nice and fun is just like interaction.

Interviewer

Right, so just moving away from. The objects themselves a bit as well. This project is very much linked to 3D printing. Of course, these models were all 3D printed themselves. And a potential sort of avenue for distribution of these objects could be, you know, sending the code files that people could print out themselves to use so Would you ever consider owning a 3D printer in the future? And do you think that maybe they could be more widespread for general use like regular printers?

Participant

I personally would consider owning a 3D printer not like in the foreseeable future in sense that I don't have a concrete plan to buy one, but I'm toying with the idea of buying one, or like buying the components and building one as you do usually and then 3D print more components for your printer. But that would be for me mostly like just like a hobby thing where I buy it, not because I need it for something useful, but because I like want to fiddle with a model to prototype things for just like using free time my spare time. I don't know if it will be as widespread as paper printers. I mean, you see that the prevalence of paper printers is going down, and most people don't own those things anymore because it's kind of inconvenient to have that thing standing around and then having to bother with buying the ink and whatever. And I mean currently, definitely the 3D printing is more cumbersome. You have to really monitor the printing process and see that nothing clogs up or goes pear shaped or whatever. I mean, sure, with more development, that thing will probably get less cumbersome and less annoying, but I can't imagine that it will ever be like so plug and play or like it won't be so plug and play in the foreseeable future that really wide adoption for 3D printers is to be expected, but maybe there will be widespread enough that you will have like 3D printer copy shops that instead of like ordering it from the company that makes 3D objects. You still could get the file and then go to your local makerspace and just do like one off prints and get it done there.

Interviewer

So potentially, rather than it becoming a widespread, everyday sort of a device and hopes it could maybe be still reserved for enthusiasts. But maybe become maybe access to them can become more easy.

Participant

Yeah. I think I would bet some amount of money on like 3D printer copy shop Style Enterprises being a thing of the future.

Interviewer

Yeah OK, that makes sense. I think that is all of the questions I've got written down. Your input is very helpful and of course, I just want to reiterate for maybe the third or fourth time that all of all of this stuff that you have provided will be anonymized. And the audio will be deleted in the end after being transcribed. So thank you very much for your input. I'm going to stop recording just now.