Blocks with an Attitude...

Appendices to the report

Appendix 1: Scenario

The following narrative scenario was written to envision how BlockMe might be used in practice, when assuming everything goes as intended. This scenario was written to help identify the different important play situations and contributing design principles as outlined in sections 3.3.1 and 3.4 respectively.

It's break time. Kevin gathers his friends, and together they walk to their teacher, Miss Lisa. "Miss Lisa, can we play with BlockMe?", they ask her. "All right!", she responds. "You can start building with the blocks, that are already in the corner, in the meantime I will get the rest of the set, OK?".

Excitedly the children gather the material on the floor and start playing around with the blocks. Soon miss Lisa returns with several blocks that look a little different from the blocks on the floor. Whereas they are plain looking, these blocks are white, with patterns and soft surfaces on the sides.

"What's so special about these blocks?" asks Anna, one of Kevin's friends.

"Oh right! I guess you have never played before," Kevin replies, "Well these blocks are special, because two of them have a bit of a temper! If you are very loud while close to them, they will get angry and eventually start to shake, destroying the castle we're going to build!"

"They can get mad??" asks Anna in disbelief.

"Yeah, but don't worry we can calm them down again if we're nice to them and stroke them a little. Then they will go to sleep again for a while!"

Anna laughs. "Ok, I'll have to see it for myself, I guess. But how will we know which are the ones that have an attitude?"

"Well, we can't see them now," Kevin shrugs, "we just have to start building and then they will reveal themselves."

The children set off to build their castle. Anna is a bit nervous, bus excited for what's to come. Meanwhile Frank, one of the other boys, keeps a close eye on the blocks. Generally, he's a calm boy, but today he's got a taste for destruction, and plans on doing everything he can to agitate and set off the interactive blocks. The construction is already taking shape, when he notices a sound coming from within the structure. He closely observes the blocks near to where the sound originated from, and suddenly he spots one of the blocks lighting up. Frank looks around, but it doesn't seem anybody else has noticed it yet. He sneaks towards the block, placing a regular building block nearby. Everybody still seems distracted with building the castle. "Good," Frank thinks, "I've had enough of this, let's bring it down!!", and he starts to loudly clap and yell at the block. While doing so, this sensitive block starts to make excitable noises and turns more and more red. The other children quickly start to notice what's going, on and spring to action. "Hé! Don't do that yet, Frank!", Kevin yells while he runs over and tries to silence Frank. "Quick, somebody calm it down!", he commands while trying to keep frank away from the block. Some of the other kids gather around and quickly start caressing the excited block. While emitting approving, soothing noises, the block turns from red to green and after continued caressing it appears to go back to sleep again.

Just as all the excitement dies down a bit, the group starts hearing a rumbling noise. While it gets louder the blocks start to shake, and not a moment later a big part of the castle starts to collapse. Kevin looks startled, "what just happened? I... I thought we stopped him". As he looks at the collapsed area he sees a smiling Lisa standing there. "W-was it you?!", he exclaims.

"Ha-ha, sorry Kevin." Lisa laughs, "I just couldn't help myself! I was so curious what would happen. So, during all the commotion, I snuck around and found the other angry block. You were all so busy trying to stop frank, that you didn't notice me setting that one off at all!"

Kevin's a little annoyed, but as everybody starts to laugh he just can't stay mad at Lisa and a smile appears on his face.

"Ok, well played Lisa, I didn't expect that of you!", he compliments her, "Alright Everybody! Let's start again. - And maybe this time we can build a little while longer before we set them off again?"

After falling, the interactive blocks stay asleep for now. But as they are implemented in the building, they will soon start to show themselves again. Little Lisa is already excited for that to happen, what will she do this time? Will she go the same route again? Will she, this time, help the group in stopping Kevin? Maybe everybody will

want to destroy the building after they're done. Wouldn't it be fun to sabotage them then, by preventing the blocks from getting agitated! "Many exciting possibilities," she thinks, "I'll just have to wait and see what I feel like!"

Appendix 2: Coding analysis

Analysis session 1

Session description
Participants: *4*
3 girls, 1 boy.

Throughout the session multiple structures are built by the participants with the prototype, which are then often destroyed using the interactive blocks. The children experiment and explore different ways to do these two things. During the first 9 minutes of building the participants build mostly separate in two to three groups. After that, they work all together for 6 minutes, building and communally destroying two structures. During the whole sessions, some participants are generally more interested in building that the others. Especially near the end of the session, shortly before and after conducting the final interview with the participants, all but two of them become more interested in throwing and kicking the blocks around, then building with them.
The interactive blocks are used mostly for destruction of buildings. They are often kept separate and only put on top of the towers for this goal in the end. The duration of building and destroying towers is short, this process never lasts longer that 3 minutes. Most of the time the destruction of the towers happens consensually, mostly involving the builder(s) of the structures and sometimes others who are attracted by the shouting. The interactive blocks are mostly kept separate and controlled by two participants, with the others repeatedly expressing interest in -, and trying to obtain these blocks. Stealing and scavenging of, especially, these interactive blocks is a source for commotion between the participants. Something interesting to note is that the collapse of a structure containing interactive blocks often created an opportunity for these blocks to change hands, by quickly grabbing them from the rubble. Otherwise, the children generally play nice and cooperate together.

Relevant situations
From 14 identified instances of relevant play with the prototype, 3 were determined to resemble play as envisioned. They are described below:
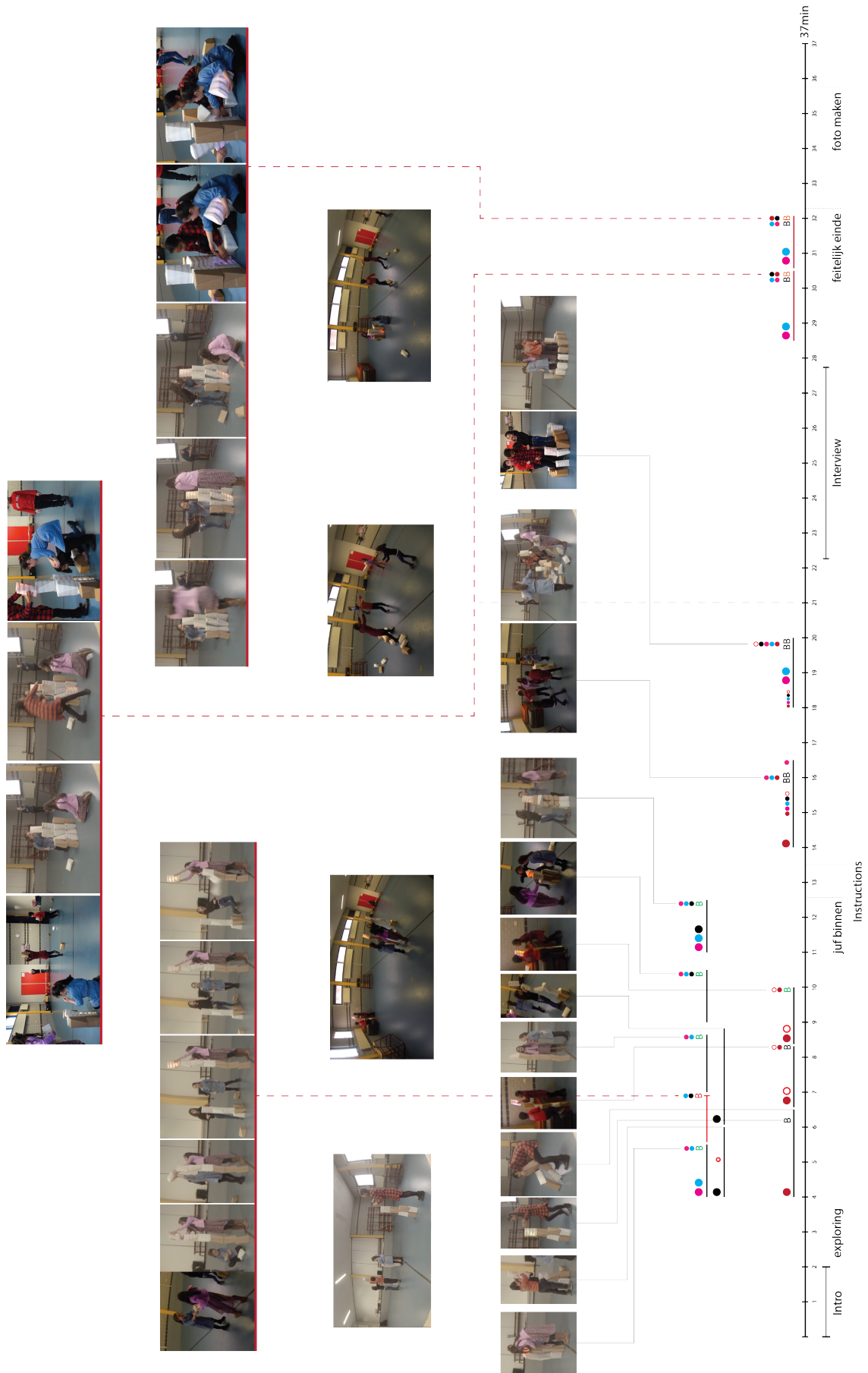
Intro   exploring   Instructions   juf binnen   Interview   feitelijk einde   foto maken

37min

Situation #1

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
			Because of BlockMe		✗	✔	-

The girl in blue (Blue) and the girl in purple (Purple) generally play together in the session. Purple is generally possessive of the interactive block, and the more controlling of the two. Blue, who has been trying to get a special block, tries to obtain the one Purple has been holding, who reluctantly gives it up. When she then wants to place the interactive block on top of the tower they've build together Purple takes the block back from her. In reaction, Blue discretely moves over to the girl in black (Black), who has been playing with/alongside them and asks her to make noise. While Purple positions the block on top of the tower, Black starts to loudly scream. Through the commotion the towers falls from under Purple's hands. When this happens, Purple reacts seemingly annoyed, stamping her feet and gesturing to Blue, but also smiling about it. Afterwards they start over building their tower.

Rebelliousness	✔	✔	*Because of BlockMe*
In other cases, the girl in blue cooperates and does not intervene. But here she chooses to respond to the controlling behavior of the girl in purple, instead of letting it slide. She consciously involves another party to sabotage her. There is an apparent moment, where she seems to consider what to do, before asking for help. She seemingly does so somewhat covertly, and judging as well from the reaction of the girl in purple, she knew that this was not what the other wanted to happen.			**Block Play (conformist activity)** _____ ✔ The girls build together and there seems to be a clear plan, which most of them conform to. This gives the girl in question something to oppose. **Opposite possibilities for play** _____ ✔ The prototype enables her action by providing her with an opportunity to rebel. She clearly uses the functionality of the Block to sabotage another. On the other hand, these opposite possibilities did not seem to have motivated this act of sabotage. Instead it resulted from conflict surrounding possession of the blocks and her motivation seems to be revenge.
Conflict	✔	✗	**Countdown** _____ ✗ The tower falls accidentally and the countdown process does not come into play.
There are some signs of conflict throughout, leading up to this moment, relating to the possession of the special block. Where the girl in purple is the more dominant of the two. A clear confrontation, resulting in this moment, is not directly apparent, but there a discord between them.			**Attaching value to the creation** _____ ✗ Purple does seem a bit annoyed that the tower fell over, but I believe more so because she was interrupted in what she was trying to do. In any case, there does not seem to be a motivation to try and save the tower. Not now nor in future cases.
Interplay	✗	-	
The girl in purple is not really able to respond, already holding the block. Soon after, the tower falls accidentally in the commotion.			

demolished using the block

demolished using the block

block goes off accidentally

conflict

accidentally falls over

accidentally falls over

hiding game

intro

instructed to build together

only one interactive block

Block being repaired

request not to play soccer with the blocks

instructed to build together using both interactive blocks

Block functional again

completely lost interest in building

interview

1. 2. 3. 4. 5. 6. 7.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
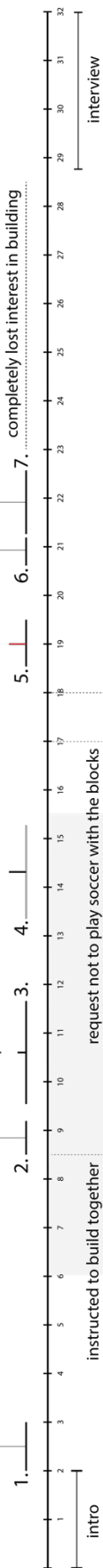
2 elements of proposed play behavior, 2 contributing factors of the prototype.

Close resemblance to proposed play

In this situation there is a clear and intended use of the prototypes functionality, for what I consider to be a clear rebellious action, with an apparent motivation. And trough this act, the rebel stands up for herself, by going against something, that has been imposed on her by another. But ultimately, the action also appears to be done with light-hearted intentions and the whole situations unfolds in a, seemingly, playful and fun matter. Furthermore, this situation emerged while everybody involved is engaged in play / construction with the prototype, and it involves several different interactions between the players, leading up to it. Although there is still much deviation between this moment and the proposed progress of play, I find that, in essence, this is close to how rebellious play with BlockMe should work out.

Situation #2

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
				Because of BlockMe	✔	✔	-

At the end of the session, after the interview, the children were allowed to play for a bit longer. During this time three of the participants were mainly involved in running around, throwing blocks around at each other and generally making a ruckus together, clearly having lost interest in the BlockMe game. The other two participants (Purple and Blue) are the only ones still building. This time they've incorporated both of the interactive blocks, one of which Purple has had all along. The other one they've received from the girl in the red checkered shirt (Red) One of the special blocks is incorporated in the bottom of the building and the other one is placed on top of the structure after they're done building. At this point they, together, start screaming to activate the interactive blocks to make their structure collapse. Responding to the sound the others run over. First Red, who grabs the top interactive block, while yelling: "can I have one?". While Purple And Blue React to this angrily, Black Jumps towards the bottom interactive block and starts screaming, while Blue Pushes her away. At this point the Blocks go off and the structure falls over. The two girls are visibly and audibly upset and disappointed towards the perpetrators. The girl in black (Black) just walks away, whereas Red Seems to be slightly remorseful, trying to explain her actions by saying: "But you guys have two.. so you can use that one right?". After which se also (slightly hesitant) walks off. The girls start to build again when Red quickly brings the block she took back, which the two girls seem happy about.

Rebelliousness	✔	✔	*Because of BlockMe*
They both do something, of which they can expect that it is against what the others want. Furthermore, it does appear to me that they have a moment of reflection, as they pause for a second, after noticing the screaming. Before slowly but deliberately walk towards the block tower, clearly intending to do something. Especially the girl in black waits a bit longer, and almost as if motivated by seeing the disappointment of the girls, in reaction to the action of the girl in red, she then seems to decide to also sabotage them.			**Block Play (conformist activity)** _____ ✔ By playing with the blocks the two girls create clear groups against which the others can rebel. Since the other these girls were not part of the building activity with the other two, there isn't really a moment where they decide to stop confirming within the group. Though It could be argued, that they stop conforming to the status quo, that resulted from the formation of two distinct groups, where, until now, they have left each other alone. **Opposite possibilities for play** _____ ✗ At least the girl in black clearly uses the possibility provided by the prototype to, seemingly, sabotage the others. Though these acts only happen when the other girls are already trying to destroy their creation. It would have been more clear had they decided to sabotage the girls while they where still building. Furthermore, although they respond to the yelling of the girls and in that way their actions relate to the prototype, they do not appear to me to have been motivated by these opposite possibilities.
Conflict	✔	✔	
The (rebellious) actions of the the two definitely seems spark a moment of conflict between them and the other two girls. There also seems to be some resolvent after this.			
Interplay	✗	-	**Countdown** _____ ✔ Because the tower doesn't immediately fall, there is a moment where some additional things happen. Though it does not lead to interplay. **Attaching value to the creation** _____ ✗
There is some conflict, but no interplay using the prototypes functionality happens.			the girls seem very annoyed that their game is disturbed, and that their tower falls over *because of others*. Enough so to physically try and stop them. However, they were already in the process of destroying their building. They did not try to save their structure in oder to continue building.

Verdict:
2 elements of proposed play behavior, 2 contributing factors of the prototype.
Some resemblance to proposed play
It does appear, that these rebellious actions have to do with the prototype and that It facilitated this behavior, in some ways; Because the girls, who built the structure, start the process to destroy it, the others feel convertible to take over this process and thereby sabotage their plans.

Situation #3

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
				Because of BlockMe	✔	✔	-

After situation #2, Purple And Blue Rebuild their tower and when done start screaming again to set off the special blocks. This time only Black Responds to the noise. she stops too look, quickly walks over and starts to yell as well. In response Blue gives her a push away. This stops Black For a short while, then she starts yelling again as well and they all three yell against the blocks, until the tower falls partly over. Then Red walks over and tries to (sneakily) take the special block still in the tower. In response Blue Quickly pushes that block away, after which Red forces over the rest of the tower still standing. The incident end before it resolves itself, because I stop the session at that point because it is time.

Rebelliousness	✔	✔	*Because of BlockMe*
Simular to the previous situation. It is especially apparent because this is the second instance in e short period of time. By now it can be assumed they must be aware that these actions are not appreciated. Still they do as they please.			**Block Play (conformist activity) _____ ✔** Simular to situation #2 **Opposite possibilities for play _____ ✗** Simular to situation #2 **Countdown _____ ✔** Simular to situation #2 **Attaching value to the creation _____ ✗** his time the girls seem slightly annoyed when the girl in black joins them, but don't make too much of a deal about it. Then when the other girl tries to grab one of the interactive blocks again, the girl in blue does seem more annoyed, although presumably not because of something to do with their creation, only because she taking the block they are using.
Conflict	✔	✔	
Simular to situation #2			
Interplay	✗	-	
Simular to situation #2			

Verdict:
2 elements of proposed play behavior, 2 contributing factors of the prototype.
Some resemblance to proposed play
Simular to situation #2

Analysis session 2

General description
Participants: 4 boys

During the second session, not much elaborate play with the prototype emerged. Things just don't really get off the ground, in comparison to session 1. Only a few substantial structures, involving multiple people and/or interactive blocks, are build. 5 instances where identified, in comparison to 14 in session 1. Furthermore, at least two of these structures resulted directly from instructions/suggestions to build together. These participants seem to have a harder time grasping the principles of BlockMe compared to the children in the first session. They need more instructions as well as time for discovery. Something that complicates things more, is that one of the blocks doesn't function properly anymore after the previous session. This seems to make it more unclear for the children how exactly the interactive blocks work.

In this session, the interactive block is only used three times, by a participant to intentionally destroy structures. In two cases the block is already triggered (by the surrounding noise) before players (can) really start yelling themselves. In one case this leads to a surprise destruction of the tower. In the other case, there is some yelling by the group but block is already going off. Generally, throughout the session the interactive block(s) go off unexpectedly more often. It seems difficult for the players (for a large part) to get an understanding of the feedback the blocks give. Furthermore, there is in this session no (intentional) stroking of the blocks in order to calm them, which could help them to prevent these situations and/or gain more control.

Most of what the participants do with the interactive blocks is scream at them together in various places. This appears to be, at least in part, due to the one block being broken. This seems (at least initially) to lead them to trying to figure out if - and with which of the blocks - something is wrong, by repeatedly yelling at them. Generally though, all but one of the participants do not seem to be too interested in doing much more with the blocks. There is some discovery and creativity with the interactive blocks separately, but they don't appear all that interested in exploring/discovering ways of building and destroying with the prototype (as in session 1). Noticeably, for instance; when the second block is (finally) fixed and given back to them, they are excited but ultimately this doesn't lead to any more/other play with the prototype. Only when they are given an explicit suggestion to try using both of the interactive blocks in a big tower do they try to build and destroy with the prototype again. Even then, this only leads to a single instance of building, after which they mostly start doing other things again (e.g. at this point, running around and playing soccer with the blocks).

It must be noted, that these participants seem to be a bit wilder than those in session 1, with the exception of one of them. They are a bit louder and less attentive, which seems to be a cause for the interactive blocks to, repeatedly, go off unexpected, because of all the surrounding noise. While the others are generally making a ruckus, the remaining participant seems much more captivated by playing with the prototype (in a structured, goal oriented way). Throughout the session he comes up with ideas and plans to use the prototype, and tries to get the rest to join in. Sometimes the rest cooperates, more or less so. But often his attempts fail, because the others do not seem to have the patience to follow his instructions.

Relevant play situations

7 instances of relevant play behavior with the prototype were identified. Of these instances, in 3 had further signs of the intended play behaviors. Ultimately only one instance was determined where the mechanisms of the prototype lead to play which resembles play as proposed.

	verdict	Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	interplay
Situation 1	✗	✔	✔	✔	✔	✗			
Situation 2	✗	✔	✔	✔	✔	✗			
Situation 3	✗	✔	✔	✔	✗	✔	✔	✗	✗
						Because of BlockMe:	✗	-	-
Situation 4	✗	✗	✔	✔	✗	✗	✗	✔	✗
						Because of BlockMe:	-	✗	-
Situation 5	✔	✔	✔	✔	✗	✔	✗	✔	✗
						Because of BlockMe:	-	✔	-
Situation 6*	✗	✗	✔	✔	✔	✔			
Situation 7	✗	✔	✗	✔	-	✔			

* in situation 6 one boy is playing with two blocks, one of which is interactive. At some point another boy leans over and starts yelling, while the first one keeps doing what he's doing (ignoring him). There are no further interactions between the two and situation doesn't develop any further. Therefore, it isn't further assessed.

Session 3.1   Session 3.2   Session 3.3

Interrupted by end of session   additional particpants enter   no more playing with the prototype   break over

Overview session 3.1   Overview session 3.2   Overview session 3.3   Overview end session

Situation #3

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✗	✗
			Because of BlockMe		✗	-	-

1   2   3   4   5

Two participants start building a tower, while the others are busy with one of the special blocks (1). shortly after, the other two participants join in building the tower (2). They discuss the best way to go about this while building, careful not to make an unstable tower (again). Halfway through, the broken block appears to work again and two of the participants (a & b) come pick it up. While they try out the block, loudly yelling at it (3), the other two (c & d) finish the tower. Just as they start to trigger the interactive block that they placed on top, the other two boys with the repaired block (a & b) ask them to wait. One of them (a) proposes that they should scream from afar, but one of the others (c) is hesitant to walk away, afraid that the tower might fall over (because of the interactive block?). next, the other of the two boys (b) walks over with the repaired interactive block and wants to put it in top of the tower as well. The other two (c & d) stop him, afraid that it will make the tower fall over. He (b) responds saying that this block works now, but they push him away none the less (4). He accepts this and seems to acknowledge their position. Shortly after one of the boys (d) notices that the block has already gotten angry (because of the various moments of screaming) and they all excitedly watch as the tower is destroyed by the block (5).

Rebelliousness	✗	-	*Because of BlockMe*
The plan of the majority of the group is to make the tower fall. the boy with the repaired block (2) makes a suggestion, but doesn't further try to impose his plans on others. Even though they **push him away**, he does not seem to have had the intent to obstruct the others. More so he seems to merely wants to add to the game.			**Block Play (conformist activity)** ✔ Together the players build the tower, and make the decision to trigger the blocks. The boy who wants to place his block on the tower complies when the others object. **Opposite possibilities for play** ✗ There seems to be a consensus to trigger the blocks, there is only the question if the additional interactive block should be put on the tower.
Conflict	✔	✗	**Countdown** ✗ The players are not aware that the block is already set off.
There are some disagreements between the two groups of boys (1 & 2 and 2 & 3), this even leads to some pushing			**Attaching value to a creation** ✗ Although the players are proud of their structure (they excitedly tell me too look at it when it's done), there is nobody interested in saving it before it falls. The reason they are careful while building, is because they don't want the tower to fall before they can destroy it.
Interplay	✗	-	
(Because the block goes off,) There is no further development of the situation, or use of the prototype.			

Verdict: **does not lead to proposed play, no specific contribution of BlockMe.**
This situation isn't clearly elicited by the mechanisms of the prototype. This small conflict does not lead to any further development or interplay between the players, nor to further interactions with the prototype.

15

Situation #4

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✗	✔	✔	✗	✗	✗	✔	✗
			Because of BlockMe		-	✗	-

This situation is a bit different from the others, because it doesn't involve building, but as it was as a developing situation, and therefore further analyzed. One of the boys comes up with a game where he is going to hide the interactive block amongst the other blocks, while the rest must keep their eyes closed. They also can't talk (because then the block will go off before he's ready). When he's ready, they will all yell together and the others must find the block between the rest of the blocks. The rest of the boys cooperate and lie on the floor in a circle with their arms in front of their eyes. While the boy in charge is still gathering more blocks, two of the others try to sneak a peek and to their amusement they spot each other. This makes them laugh, and the boy in charge, annoyed, asks them not to look. One of the boys tells him that they are not looking. In reality, the boys are obviously looking at each other, which makes them all laugh more. The boy in charge tells them to cut it out, because they have made the interactive block turn on. When hearing that the block is on, the boys sit up and look. The boy in charge tells them: "no wait, not yet!", and tells them that they are now going to do it again, for real. He gives them more instructions, but the boys are not listening anymore. While the boy who was in charge is still busy gathering more material, the interactive block goes off, which leads to some excitement and yelling from the others. Next, they hear me testing out the broken block, which is now fixed. When seeing that it works again, all but the boy who is busy with the preparations for his game, come over to get that block. The boys, who already didn't seem too engaged with the block-hiding game, now go play with the new block. The remaining boy, with the other interactive block, quickly joins the others as well. Together to take the two interactive blocks to play with them somewhere else.

Rebelliousness	✔	✔	*Because of BlockMe*
The boy who has come up with the game, dictates the others what they have to do. While they largely cooperate with him, they seem to find enjoyment in not completely doing as he says. They do this even though they are aware that this annoys the game leader. Quickly after they completely stop complying.			**Block Play (conformist activity)** ✔ There is a common activity created with the blocks, with rules that players should adhere to. **Opposite possibilities for play** ✗ The prototype is not used in this way. **Countdown** ✗ The prototype is not used in this way. **Attaching value to a creation** ✗ The prototype is not used in this way.
Conflict	✗	-	
They boy in charge is somewhat annoyed by the others, but doesn't lead to any further arguments or conflict.			
Interplay	✗	-	
There is no further development of the situation, or use of the prototype.			

<u>Verdict:</u> **does not lead to proposed play, no specific contribution of BlockMe.**
The game the boy comes up with is using the properties of the interactive blocks, but any further actions do not relate to the prototype. Furthermore, the players get distracted before the game can truly start, and does not lead to any further development or interplay between the players, nor to further interactions with the prototype.

Situation #5

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✗	✔	✗
				Because of BlockMe	-	✔	-

After not having used the blocks for building in over 6 minutes, the participants are suggested to build a big tower together. Using both of the interactive blocks, now that the second block is functional again. The boys do so and while building have some discussion how to make sure the tower is stable. Two of the boys suggest (loudly) to start screaming, but the other two want to keep on building a bit higher first, and one of them tells the other two to wait. In response, one of them tells the boys who are still building: "otherwise it'll [already] fall over, let's just scream now". The two builders don't respond, and carefully place another block on the tower, together balancing the structure. Before each of the boys has let go of the tower, one of the others quickly says: "3..2..1!", and starts yelling. There is not much of a reaction to this from the builders. One of the boys is still holding the tower. Because the blocks now have been triggered (seemingly because of this yelling), the other boy who is not building, tells the one still holding the tower to let go, reaching for his hand. He complies and lets go. Now that the tower is unsupported it becomes unstable. This leads the other boy to quickly take back down the two blocks which were just put on the tower by the builders. The tower is now stable again, just in time when the interactive blocks (in the base of the tower) go off. The rest of the tower falls to some excitement of the boys, after which they take one of the interactive blocks elsewhere to play with it.

Rebelliousness	✔	✔	*Because of BlockMe*
It is clear that the other players want to continue building, as was the plan. Nonetheless the other boys start yelling when their suggestion is not followed, as well as making one of the builders let go of the tower.			**Block Play (conformist activity)** ✔ The players start out together working in the same direction, discussing how to do so. **Opposite possibilities for play** ✔ Because of this, two players abandon the construction activity, while the others want to continue building, leading to a rebellious act.
Conflict	✗	-	**Countdown** ✔
Although there is a difference in what the two groups want, no real conflict to speak of emerges from this situation. The two boys don't seem to mind too much that the tower gets destroyed by the others in this way.			During this time, there are some additional interactions between the two parties, mainly one making the other let go of the tower. The limited amount of time seems to lead him to make this rash decision, so the other boy is not still holding the tower when the block goes off. **Attaching value to a creation** ✗
Interplay	✗	-	Although the two boys want to keep building, the goal seems to be to (soon) destroy it together. There is no attempt to save the building, and they don't seem to mind that it falls over.
There is no further use of the prototype where the participants try to stop each other.			

Verdict: **prototype lead to what resembles proposed play**
This situation contains some elements of the intended described play: Two groups seem to emerge, because of the opposite possibilities for play provided by the prototype, where one group is indeed ready to destroy earlier than the other. This leads to a seemingly rebellious act. What it doesn't lead to though is any further development or interplay between the players, nor to further interactions with the prototype. this situation is therefore determined to somewhat resemble play as intended, partly evoked by the prototype.

Analysis session 3

General description

In total 23 children participated, the majority (17) aged 9, three aged 8 and the remaining three aged 10. Of the participants 9 where girls, all aged 9. The remaining 14 participants were boys.

Session 3 consisted of 3 sub-sessions:

In the first sub-session 8 children participated, 2 boys and 6 girls. Overall in this sub-session there is relatively frequent relevant activity with the prototype. During the session, the participants spend their time building and destroying structures together. Discussing and working together while they do so. There is also some other play with the blocks, such as discovering which are interactive, and trying to obtain interactive blocks from each other. Aside from some bickering and teasing here and there, generally their activities are harmonious. Only one instance of true conflict was identified, as well as one instance of rebelliousness that lead to minor further conflict.

In the second sub-session 5 boy participated. In this session, not a single noteworthy structure gets build. Interactions with the prototype are limited to exploring the blocks, yelling and shaking them, trying to find the interactive blocks and make them go off. Later they also start throwing and kicking the blocks (to each other), as well as trying to obtain (interactive) blocks from each other. In comparison to the previous group, they seem to have a harder time grasping what to do and how the interactive blocks work. More than once they ask what to do and are confused that the blocks won't work, when screaming at them while simultaneously holding them.

In the third session, initially 8 children participate; 7 boys and one girl. Later on, two more girls, who missed the second session come in (10 participants in total). During this session, we see more of the same. There is some (minor) relevant activity with the prototype, but soon most children are not even involved with the prototype anymore. Instead they are doing other things around the playground. Especially as time goes on, they start using the play equipment (of the toddlers) that they find in the play area and the blocks are hardly touched anymore. Although this group gets the most amount of time with the prototype only two of the participants spend more than two minutes engaged in relevant play with the prototype.

Generally, in the last two sub-sessions there seems to be a lot more unrest and roughhousing, with pushing, kicking, hitting and throwing with blocks (at each other). (Forcefully) taking blocks from each other, intentionally destroying (cardboard) blocks, wildly running around etc. This generally leads to some clashes, but never truly gets out of hand.

Relevant play situations

In the 40 minutes where the prototype was available to the children, only 9 instances of relevant activity with the prototype were identified, mostly in the first sub-session. In most of these instances the players built and destroyed structures while largely playing together harmoniously. 4 instances where something different happened where further investigated. Only one of these was determined to have resulted from the prototype. This resulted in an approximate total of 15 minutes (37.5% of the total time) where there is some kind of relevant play with the prototype. Of this time, approximately 2.5 minutes (6.3% of the total time) involve play that leads to further instances of proposed play behavior that can be contributed to prototype.

Of the 23 participants, 12 (52%) where involved for in relevant play for over a minute, and 10 (43%) for over 2 minutes. No participants are involved with relevant play for over 5 minutes in total.

	Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	interplay	verdict
Situation 1	✔	✔	✔	✔	✔				
Situation 2	✔	✔	✔	✗	✔	✔	✔	✗	
Because of BlockMe:						✗	✗	-	✗
Situation 3	✔	✔	✔	✔	✔				
Situation 4	✔	✔	✔	✗	✔	✔	✔	✗	
Because of BlockMe:						✗	✔	-	✔
Situation 5	✔	✔	✔	✔	✔				
Situation 6	✔	✔	✔	✔	✔				
Situation 7	✔	✔	✔	✔	✔				
Situation 8	✔	✔	✔	✗	✔			✗	
Because of BlockMe:								-	✗
Situation 9	✔	✔	✔	✗	✔			✗	
Because of BlockMe:								-	✗

Situation #2

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
			Because of BlockMe		✗	✗	-

1	2	3	4	5	6	7	8

One of the girls, in red, builds a tower and puts an interactive block on top. She then invites the rest to come scream at it (1). When the block doesn't seem to respond, they stop screaming, and seem to evaluate what is going on. One of the other girls (on the left) reaches out to touch the block (2), to which the girl in red angrily tells her not to touch it right now. She tries it again anyway, leading to an annoyed irritated exclamation from the other girl who pushes her hand away (3). She keeps doing this a couple of times, leading to the same reaction, after at some point the girl in red angrily and loudly tells her to act normal, while giving her a push (4). In response to this push, the other girl gives a slap back (5), leading to the first girl to, again, give her a punch. In response to the punch she steps forwards threateningly, leading the girl in red to quickly step back (7). When doing so she steps and breaks on one of the cardboard building blocks. and the surrounding children take this opportunity to, seemingly, diffuse the situation by shifting the attention to the broken block. When one of the others tell her that it is no problem that she broke it, the situation seems to have been completely resolved. The children go back to screaming at the block in turn. Just when they again take a break to evaluate, the block goes off and demolishes the structure.

Rebelliousness	✔	✗	*Because of BlockMe*
The girl in red build the tower and seems to be/feel entitled to dictate the rules. When she commands the other that she can't touch the block, this girl does so anyway, repeatedly.			**Block Play (conformist activity)** - The tower is built by only one girl, so there is no collective building activity. They do however collectively try to destroy the tower using the prototype.
Conflict	✔	✗	**Opposite possibilities for play** ✗ It is unclear if the girl touching the blocks is trying to save the structure, although it doesn't appear to be this way. In the end, the goal for everybody is to destroy the structure.
There is a clear, physical altercation between the two girls, resulting from the rebellious actions. In the end, the conflict is not resolved, but does fade away.			**Countdown** ✗ Throughout the process it seems unclear to the players weather or not the block is even working.
Interplay	✗	-	**Attaching value to the creation** ✗ It is unclear why one of the girls wants to touch the block, as well as why the other doesn't want her to do so. There is no indication though that this is because they want to preserve the structure.
Although the girl touches the block, it is unclear if she means to deactivate it. This does not clearly seem to be her motivation. Furthermore, it doesn't lead to the other trying to activate the block again. There are further conflict interactions by slapping and pushing each other, but they are unrelated to the prototype.			

<u>Verdict:</u> **no instances of proposed play behaviour that can be contributed to the prototype.**
Although the situation revolves somewhat around the prototype, it does not clearly seem to have a specific impact on it. The presence of the prototype does not seem to be a necessity for this situation to happen.

Situation #4

| Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
			Because of BlockMe		✗	✔	-

1	2	3	4

Four girls are involved in building a structure. A plan is discussed of how exactly they will go about it. One of them is already somewhat recalcitrant e.g. screaming at an interactive block another is holding (1), and (briefly) sitting on the base layer of their structure, which leads to some slightly annoyed reactions. While the others are building, initially she stands around, until she also arranges two blocks (stealing them from the other group). On giving the second block to one of the others (2), who puts it on the tower, she stands with her hands in her hair for a second and then, before anybody else can react, quickly yells to the interactive block (3). This leads to a very slight push from one of the others (4). Then, in turns two of the others yell against the block, but nothing happens. Then, one of the girls comes up with a new game, where they are going to have a competition with the other group who can make their tower fall first. While she is discussing with the other group the other girl is getting ready to scream again. One of the others asks her not to, and this time the she complies. While waiting, she and the other get involved with some friendly play-fighting, seemingly to pass the time. Before the competition between the groups can start, the session ends, which leads to them all quickly screaming against their respective towers. During this process, the girl in question picks up one of the interactive blocks, leading another to take it back from her, putting it back on the tower. In response, another girl also gives her a (seemingly) friendly shove. When the blocks don't go off before being stopped, the two towers are demolished by pushing and kicking them over respectively. With the girl in question taking initiative to kick over theirs, joined by one other.
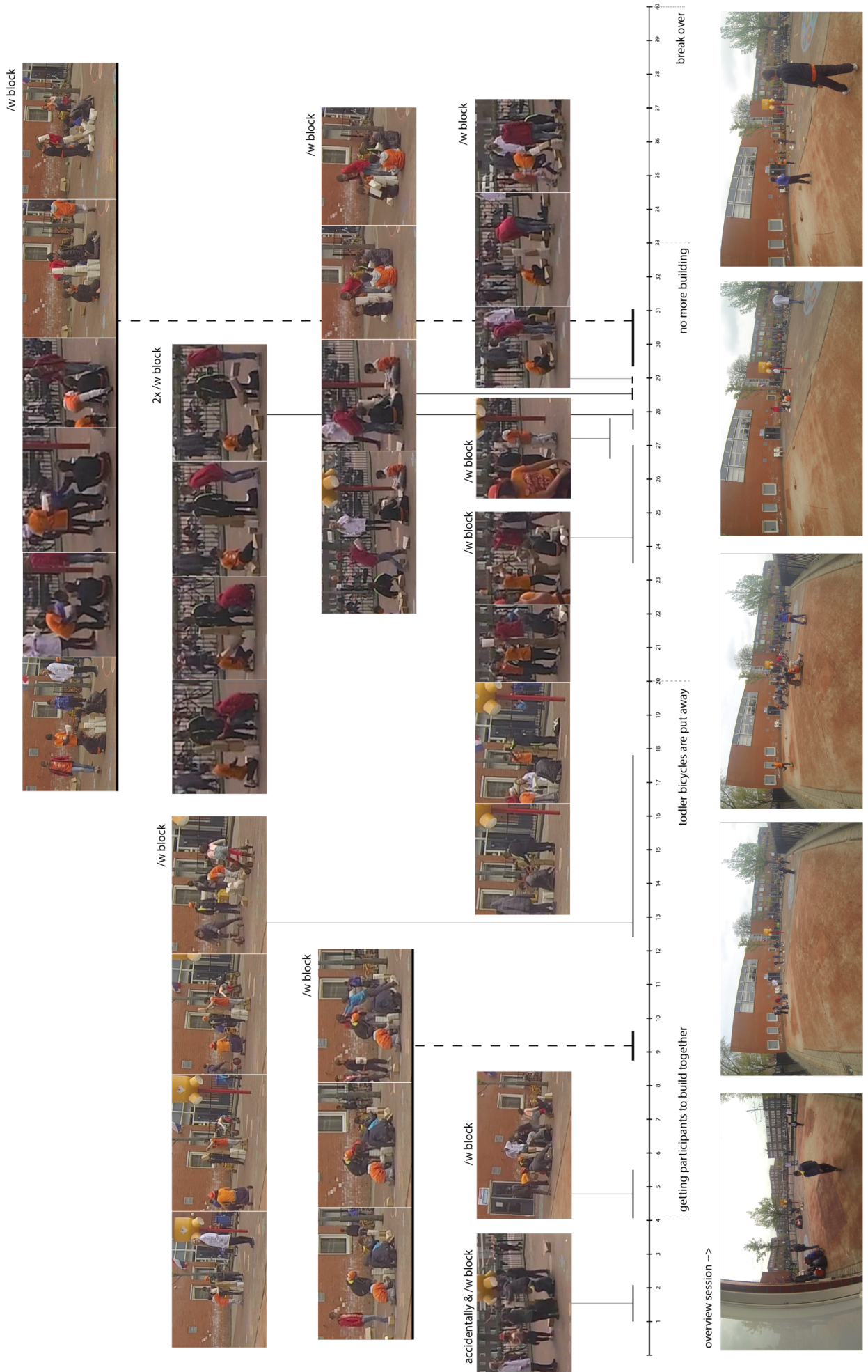
/w block

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/w block

/w block

accidentally & /w block

getting participants to build together

todler bicycles are put away

no more building

break over

overview session -->

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Rebelliousness	✔	✔	*Because of BlockMe*
The girls make some plan of what they are going to do. The girl in question is present there. During the building stage, she is only incidentally involved. Yet, before any of the others can react she decides to act (otherwise) without the consent of the rest and opportunistically tries to set off the block. During other times in this situation she also does other things that clearly go against what others want. It is also clear that she is aware of this, as others have signalled to her multiple times not to act like this. Yet she does it anyway.			**Block Play (conformist activity)** ✔ The girls build together and there seems to be a clear plan, which most of them conform to. This gives the girl in question something to oppose. **Opposite possibilities for play** ✔ Although it does not seem that the others want to keep building, the possibilities provided by the prototype lead the girl in question to set off the block before the others can. **Countdown** ✗ It does not seem clear to the players whether or not the block has been triggered. At least they do not try to calm the block after the girl in question yelled first. **Attaching value to the creation** ✗ There is no indication of this. There is no specific attempt to preserve the structure.
Conflict	✗	-	
The interactions remain playful, and the others seem to mostly tolerate her. Yet multiple times there are some minor moments of conflict involving (friendly) physical interactions. The rebellious act does not lead to any further conflict though.			
Interplay	✗	-	
Although there are multiple minor moments of conflict and rebelliousness, there is no (further) interplay utilizing the prototype.			

Verdict: **elements of proposed play behaviour that can be contributed to prototype.**
The possibilities presented by the prototype lead to minor moment of apparent rebelliousness, using the functionality of the interactive block. Ultimately, this does not lead to any further instances of proposed play interactions. Therefore, this situation only has a minor resemblance the envisioned play with BlockMe.

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
		Because of BlockMe			✗	✗	-

| 1 | 2 | 3 | 4 | 5 |

Three girls are playing together. They have built a small structure, with an interactive block on top. they yell together, setting off the interactive block (1). It shakes, but the tower doesn't fall over. while the block is still shaking, one of the girls tries to (in blue) wants to take hold of a block, but is stopped by another girl (2), who tells her to wait. The first girl hesitates a moment, but grabs the block anyway, leading to a disappointed reaction from the other. In the meantime, the third girl takes the interactive block, but the other takes it back, saying that it is hers (4). Two of the girls walk away, leaving the other. She tells the other: "again, again!", but they leave nonetheless (5)   .

	✔	✗	*Because of BlockMe*
Rebelliousness			**Block Play (conformist activity)** ✔
Both girls each take a block away after the other has clearly asked the others to leave them alone. In turn, the takes one of the blocks (that she did bring initially) back. Both cases can be considered to be rebellious.			The girls start off playing together, seemingly in unity. Only later a difference in interests emerge, leading to conflict and rebelliousness.
			Opposite possibilities for play ✗
Conflict	✔	✗	These is no indication that this is the case. It is unclear why the girls want to take the blocks, but it does not seem to be for either of these reasons.
The actions of the two girls, and the wish to stop them from doing so of the other, leads to a visible moment of conflict.			**Countdown** ✗
			All of these interactions happen after the block has already gone off.
Interplay	✗	-	**Attaching value to a creation** ✗
Apart from taking the block back from one of the girls, there is no further interactions between them or the prototype.			There is no clear indication that this is the case. The girls had already set off the block to destroy it. It seems that the girls in question didn't want to others to take the blocks, mainly so they could try again (as she tells the others as they walk away).

<u>Verdict:</u> **no instances of proposed play behaviour that can be contributed to the prototype.**
Although the situation revolves somewhat around the prototype, it does not clearly seem to have a specific impact on it. The presence of the prototype does not seem to be a necessity for this situation to happen.

Situation #9

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
				Because of BlockMe	✗	✗	-

| 1 | 2 | 3 | 4 |

Two participants are playing together, they have built a tower with an interactive block in it and now are yelling to set it off (1). Another boy walks by, and upon hearing them approaches, pauses for a moment (2), and then throws the ball he is holding into the tower (3), destroying it. The other two yell at him annoyed, and as he passes by one of them throws a block at him (4). The boy kneels nearby for a short while, but nothing further happens and he walks away again. The others also walk away shortly after.

Rebelliousness	✔	✗	*Because of BlockMe*
By throwing his ball into the tower like that, the boy in question clearly does something that the others will not appreciate.			**Block Play (conformist activity)** ✔ The activity the two creates a situation that the other can intrude on. **Opposite possibilities for play** ✗ the destructive action of the boy in question does not seem to be elicited by the possibilities of the prototype. **Countdown** ✗ Because the block hasn't yet gone off, there is an opportunity for the boy in question to throw the ball. It doesn't seem, though, this has an impact; He does not seem aware of or motivated by this fact. **Attaching value to a creation** ✗ There is no clear indication that this is the case. The two were already in the process of setting off the block. They are just annoyed, likely because this opportunity is now taken from them.
Conflict	✔	✗	
His action provokes the others to respond by yelling and throwing a block, but doesn't evolve any further.			
Interplay	✗	-	
There is no further interaction between the children, certainly not utilizing the prototype.			

Verdict: **no instances of proposed play behaviour that can be contributed to the prototype.**
The prototype does not clearly seem to have a specific impact on the situation. The presence of prototype does not seem to be a necessity for this situation to happen.

Analysis session 4

In this session, the whole group could come and go as they pleased. This lead to a chaotic start where a large number of participants (16) entered the play area at once, who were soon all over the place. An attempt was made to get them together one time to build with all the blocks, which was somewhat successful. Already from the start there are children present who show no interest in playing with the prototype. they, for instance, find a football to play with, or mess around with (one of) the cameras. Often other participants seem to start building, sometimes making small structures, but more often than not they seem to lose interest or get distracted soon after. They will often find other things to do, instead of building. As in the other sessions, there is a lot of activity with the blocks, that does not involve building or destroying using the prototype; there is exploration of the blocks by yelling and shaking them, trying to find which work. Also otherwise, children will often try to set off the blocks, alone or in a group. Generally, play with the prototype seems to result in a lot of yelling. There are multiple instances of play, where children will hide blocks. Furthermore, there are often children kicking and throwing with the blocks. In the end, all this activity does not lead to much play with the prototype as intended. Only a couple of instances of building and destroying with the prototype can be discerned in the first half of the session. Most of these happenings are, again, short lived (mostly less than two minutes) and only involve a small portion of the present participants. The rest of the time is filled with the activities described above, as well as otherwise hanging out and playing with each other. At a certain point, in a moment where the supervisors are not paying attention, the children start riding the toddler balance bikes that were put away in a corner. Soon almost all who are present, are in some way involved with these bikes, which also attracts additional participants to the play area. After a while, action is taken and the bikes have to be to put back, as well as some of the other play material of the toddlers. Afterwards, in the second half of the session, the play area is a bit less busy, allowing the remaining participant to play with the prototype some more without as much disturbance. This leads to some additional relevant play activities, but these situations are as well again short lived. After having played without much disturbance for about ten minutes, the remainder of the players also seem to have had enough, and for the remaining 7 minutes of the session not much further activity to speak of with the prototype happens.

Even more so than in other sessions, play with the prototype never truly evolves much further than simply building and destroying together in accordance. In this session specifically, the two only instances where something else happens and these revolve merely around individuals who come yell at a structure after they've noticed others yelling.

Notably, hardly any girls (3/4?) choose to partake in this session, at least not in relevant play.

Relevant play situations

In the 40 minutes where the prototype was available to the children, only 10 instances of relevant activity with the prototype were identified. In most of these instances the players built and destroyed structures while largely playing together harmoniously. 2 instances where something different happened where further investigated. None of these were determined to have lead to proposed play behaviour that can be contributed to the prototype.

	Building	>1 participant	Block used	unified	Interaction w/ block	Conflict	rebellious ness	interplay	verdict
Situation 1	✔	✔	✔	✔	✔				
Situation 2	✔	✔	✔	✔	✔				
Situation 3	✔	✔	✔	✗	✔	✔	✔	✗	
Because of BlockMe:						✗	✗	-	✗
Situation 4	✔	✔	✔	✔	✔				
Situation 5	✔	✔	✔	✔	✔				
Situation 6	✔	✔	✔	✔	✔				
Situation 7	✔	✔	✔	✔	✔				
Situation 8	✔	✔	✔	✔	✔				
Situation 9	✔	✔	✔	✔	✔				
Situation 10	✔	✔	✔	✗	✔	✔	✗	✗	
Because of BlockMe:						✗	✗	-	✗

Situation #3

| 1 | 2 | 3 |

four boys have started building a tower (1). Soon after another boy walks over and out of nowhere starts yelling against the block construction (2). This leads one of the other boys to push him forcefully (3). Nothing further happens. After, the boy, joins the rest in playing with the blocks without further signs of conflict.

Situation #3							
Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
				Because of BlockMe	✗	✗	-

	✔	✗	Because of BlockMe
Rebelliousness	✔	✗	
The boy in question walks over to a group of other boys who are, together, involved with their own activity. He disturbs them, seemingly without reason. He acts out of his own discretion, intervening unsolicited regardless of what these other boys want			**Block Play (conformist activity)** ✔ The play activity of the others has created a group which the boy in question could intrude on. **Opposite possibilities for play** ✗ There doesn't seem to be a clear intention behind his action. He doesn't seem to evaluate the situation before he acts, so there is no clear indication that this is the case
Conflict	✔	✗	**Countdown** ✗ It is unclear if the prototype even got triggered. Even if so this didn't seem to add to the situation.
A clear, forceful push results from his action. There is no further reaction of the boy in question, and the conflict doesn't evolve further			**Attaching value to the creation** ✗ There is not any indication this is a motivation for one to push the other. It seems more likely that he pushed the boy in question because he was being obnoxious.
Interplay	✗	-	
The situation doesn't develop any further and there is no further involvement of the prototype between the involved players.			

<u>Verdict</u>: **no instances of proposed play behaviour that can be contributed to the prototype.**
The prototype does not clearly seem to have any specific impact on the situation. Although the situation involves yelling at blocks, the presence of the prototype does not seem to really be a necessity for this situation to happen.

Situation #10

| 1 | 2 | 3 | 4 | 5 | 6 |

Two boys have built a structure together, with an interactive block in it. When done, they begin yelling at it. In response two other boys walk over to look (1). Just as the two boys stop yelling, a third boy walks over and starts screaming against the tower at the top of his lungs (2). This leads one of the other boys to push him back, telling him to wait. He tells everybody to wait again, but after a short while, one of the other boys standing around still reaches over to the tower. In turn, the boy also pushes him away (4). Next, the boys are left alone again, remodel their tower (5) and then make it collapse themselves (6).

Situation #4

Building	> 1 participant	Block used	unified	Interaction w/ block	Conflict	rebelliousness	Interplay
✔	✔	✔	✗	✔	✔	✔	✗
				Because of BlockMe	✗	✔	-

Rebelliousness	✔	✔	*Because of BlockMe*
Similar to the previous situation. The intent of the boys who built the tower seems clear here, they have built it and they are trying to destroy it. Still the others get involved, even when told not to.			**Block Play (conformist activity)** ✔ The building activity the two boys creates a situation that the others can intrude on. **Opposite possibilities for play** ✔ The boys do keep building afterwards for a bit, but these options do not seem to impact the situation. There does not seem a motivation to safe the structure for the sake of building further.
Conflict	✗	-	**Countdown** ✗ The countdown process does not seem to have an impact on the situation. **Attaching value to the creation** ✗ There is no indication of this. There is no specific attempt to preserve the structure, if so it is only to destroy it again later.
These actions lead to one of the boys reacting in a physical manner, two times. There is no further reaction from the others to this. They walk away and the conflict doesn't evolve any further.			
Interplay	✗	-	
The situation doesn't develop any further and there is no further involvement of the prototype between the involved players.			

<u>Verdict</u>: **elements of proposed play behaviour that can be contributed to prototype.**
The possibilities presented by the prototype lead to minor moment of apparent rebelliousness, using the functionality of the interactive block. Ultimately, this does not lead to any further instances of proposed play interactions. Therefore, this situation only has a minor resemblance the envisioned play with BlockMe.

Combined results

In 132 minutes, there were 38 relevant play situations identified of which 4 were determined to have happened because of because of blocks, and 1 additional instance that also had some further resemblance to play as proposed. This amounted to a total 43 minutes of the overall time in which relevant play took place. These instances of relevant play on average laster approx. 1.6 minute. Overall 26 of the total 47 participants were involved in relevant play for over 1 minutes.

Appendix 3: Analysis notes

Behavior

Exploration

A big part of play with BlockMe appeared to be exploration, with practically all participants engaging in some form of activity with the blocks. Most of this revolved around picking up blocks, shaking them, yelling at them, tossing them up in the air. This is one of the first things that happen when a session starts. When an interactive block was identified this would often result in more yelling, alone, but also often in groups, to try to set it off. This was done while holding it, (which proves unsuccessful, as touch deactivates the blocks as well), as well as by putting the blocks on the floor and gathering around it. There was also more shaking of the blocks and tossing them up in the air, to try and get a response out of it. Play in this sense was done cooperatively in group form, as well as individually. For about half of the participants play didn't move beyond this exploration, if even that. For the others there was more exploration. The participants tried different ways of building and different ways of using interactive blocks for destruction of structures, testing the prototype by repeatedly doing these two things.

The atypic nature of BlockMe does seem to arouse curiosity that leads to exploration, especially in discovering which block is which. But moreover, it seems to be that the prototype simply requires a lot of exploration. Its functioning seems often unclear to the participants, as well as what they are supposed to do with it. This is signified, for example, by the amount of yelling by participants against various blocks, often without seemingly grasping what is supposed to happen, or even why they are doing it. A lack of further (prolonged) engagement might, at least in part, be due the nature and functioning of the prototype being too unclear or ambiguous to the participants. A seemingly steep learning curve and need for prolonged exploration might, in part, result in children loosing interest before the game can truly get off the ground.

Building

The prototype was used throughout the sessions for building (with the notable exception of session 3.2, where no building to speak of happened). Building activities generally did not happen together in a group with all present participants, instead smaller groups would form of about 1-3 participants. Generally when building, especially when interactive blocks were involved, there were regular instances where is was apparent that there were plans and agreements being made on what - and how to build, but other times building activities would also appear to be of a more ad-hoc nature, without much communication. When interactive blocks were used in the building process, the structure was practically always created with the apparent intention/goal to be subsequently demolished again using these blocks. Especially in these cases building mostly happened in small groups. Often with one or two children taking initiative, while the rest is standing by and sporadically helping, apparently waiting until it was considered time to set off the interactive blocks and watch the tower collapse.

Besides the relevant play situations, where interactive blocks are used, structures were also build from time to time using only non-interactive blocks. This sometimes happened in groups, but more often individually as well. These structures were often eventually abandoned, when finished or after an accidental collapse. Throughout the sessions participants would often also appear to start constructing, but subsequently not carry trough. They seemingly get distracted or otherwise loose interest and soon abandon the activity before it amounts to anything substantial.

All these activities generally did not span longer periods of time. Instead building happened quickly and iteratively, with the process from building to destruction taking on average approximately less than 2 minutes. All these activities were generally short lived, after which the participants either start over, or seemingly loose interest or get distracted.

Even though the prototype was used for building activities throughout the study with some frequency, there were also multiple instances where it was deemed necessary to further encourage the participants to build together using the prototype. This was especially the case in sessions with boys. Whereas, generally speaking, girls appeared to regularly engage, autonomously, in structured building activities together, boys would generally play less structured, more individually and engage less in building with the prototype.

This building and subsequently destroying happened repeatedly, but the activities seem to remain of a more explorative nature. The goal seemingly being to witness what will happen when the interactive blocks go off. When envisioning BlockMe it was more or less assumed that a single consistent group of players would engage in (repeated) building activities, for extended amounts of time, all working together creating elaborate constructions. In reality this does not really happen. Instead, the participants divide, continuously switching, up into much smaller groups of often less than 3 people, as well as playing individually. Even if larger groups form, often most involved are not actually engaging in building, instead they merely look on and perhaps sporadically helping, seemingly waiting until the structure is ready to be destroyed again. Moreover, it is tough that generally, often when children were seemingly grouping together, they seemed to each keep acting in a more individually motivated manner, instead of there truly being a sense of group. The real building activities are also not extensive and prologued, as was envisioned. In reality the process of building something is (very) short lived, quick and iterative, and is done in fleeting collaborations. While there are is some variation in types of constructions built and there are examples of relatively elaborate and imaginative structures, where some more time and attention did go into, mostly structures remain quite simple. Structures where predominantly straightforward towers and wall-like structures, with blocks either single stacked on top of each other, or with additional blocks stacked side by side. It seems that the shape of the BlockMe blocks lends itself particularly well for construction in specific manners, instead of giving way to diverse possibilities.

Building with BlockMe, even though it did appear to lead to some cooperation and planning, does not result in formations of strong, durable groups with the social dynamics that were aimed for, where members can truly be a part of a joint activity, have have various interactions with each other, and might really conform to. Building in this way, is supposed to set the stage that ultimately should lead to the rebellious interplay, that is at the core of the concept, to happen. However, aside from the lack of these extensive, collaborative building activities, there is a large part of participants who hardly engage in any building with the prototype at all. This might already be an important reason why the rest of the envisioned play with BlockMe also did not, or can not, emerge or come to fruition. It is at least thought that creating a more engaging and prolonged construction play activity, than the prototype offers now, is necessary in oder to create more room, than currently is the case, for interactions between children and the toy-set to happen and to see if anything more can arise from that.

Moment of choice

There are no clear signs that the moment of choice, surrounding the decision to continue building or opt for destruction, occurs during building activities with the prototype. Situations where a player starts triggering an interactive block, while others are clearly still engaged with building, did not seem to occur. Neither were there clear instances where someone would calm an interactive block when others are trying to set it off. Rather, both building and subsequently destroying generally happen mostly in unison. Apart from this, there were other instances identified where a choice, differing from a group of others, using functionality of the prototype. This decision concerns the moment when shouting starts, after the building is (mostly) done and the interactive block is at the ready. In these instances some children will quickly shout to trigger the interactive block, before anybody else in the group can or before this can be done jointly. Notably, in these cases a differing choice is made within the group. It was also observed that individuals (generally one) from outside the group (decide) to interfere with the group in a similar way: By trying to trigger interactive blocks in constructions of others, before they can do so, or by joining in (often seemingly unwanted) with yelling after noticing the yelling of others.

There are notable cases where decisions are made that diverge from what others seemingly want, either using the functionality provided by the prototype (as described above) or otherwise, where there is clearly an apparent moment of contemplation before the choice is (deliberately) made. However, similarly there are instances where actions appeared to be taken spontaneously, without much conscious forethought.

The moment of choice, surrounding the decision to continue building or opt for destruction, does not clearly seem to occur. There did not seem to be a conflict of interest between building and destroying. Rather, children appear to build with the intent to destroy. In this sense building seemed to be more of a means to an end, in order to use the prototype to destroy it again. This decision, to build and then destroy, is seemingly already made implicitly or explicitly, before or during building. Furthermore, there was no sign that this decision to destroy happened spontaneously in some and not others, during the build process. There was also no real sign of

participants who would rather choose to continue building, while while others rather destroy. More so, stroking of interactive blocks in these instances, by someone wanting to prevent destruction, did not appear to happen at all.

There ware various other instances, where an apparent differing decision was made by someone. In some cases it seemed quite apparent that the resulting acts were carried out quite consciously, in times even after a clear moment of pause and seeming reflection. Tough, in many other cases it is no so apparent if these acts are done intentionally, unwittingly of others.

As such, in oder to truly make an effort to assist children in balance their individual desires with group expectations, this moment of choice is key and has to emerge from play repeatedly and explicitly. This is not currently the case with the BlockMe prototype. In part this might be explained by the short duration of the construction activity; there might just not be enough time for this urge to destroy to arise, before the rest is done building. That is to say, if it would happen at all in this way, which remains unclear from this study. Furthermore, judging from the amount of engagement in building, compared to the interest in interactive blocks, it seems that in the current case building is not a main point of interest for many. Therefore, it seems that nobody would choose to keep building, for the sake of building, over destroying, thus in that case there is no real choice to be made. The choice for destruction apparently needs to be better balanced by incentivizing building and preserving creations.

Another problem that emerged, which hindered the possibility for making this choice, was with how children would use the interactive blocks while building. As envisioned, the interactive blocks would always be incorporated in the structures while building, so that there would always be a possibility that they might be set off. In reality though, the blocks where often kept apart, only to subsequently be put on top of the finished structure, when ready to set them off. In this way, the possibility to make this choice individually is removed, until building has already finished and this decision has already been made.

Judging from the lack of stroking interactions with interactive blocks, it might not solely be that participants never wanted to prevent or sabotage attempts for destruction. In part, many might also simply have been unaware of this functionality, or at least it might have been unclear what touching would do or what it was intended to be used for. Similarly, the interaction for triggering the interactive blocks might have interfered with choosing is well. Because making noise was chosen as the interaction, it is almost impossible to trigger blocks covertly as well as directed, making a stealthy act of intentional sabotage, for instance, impossible as well. Now, when triggering the blocks, it is immediately apparent to all, which might be a barrier for some that could prevent them from choosing to do so in the first place. This might be a reason why destroying happened communally so often. How BlockMe was envisioned, a minority in the group would try to sabotage the rest by setting off the blocks. In reality this is more of a common group activity then anything else. Presumably, the way the interactive blocks would be used and their influence on the dynamics of the overall game would be quite different if they could be triggered more discretely.

Another perceived problem with using noise to interact, is that yelling can happen in the general area of the prototype and the interaction does not need to be specifically targeted to any part of it. This makes it hard to estimate the intention of the action; is someone intentionally trying to trigger the block, perhaps in a rebellious act, or did they, for instance, just start yelling because they noticed others doing it as well? Clearer interactions might be necessary in order to better judge the intentions of players, as well making to make the possibilities provided by BlockMe more apparent, accessible and clear.

Rebelliousness

Rebellious actions, in which functionality provided by the prototype is utilized, are mainly limited to the instances as described above; where players deliberately shout towards interactive blocks, without the consent of others involved. These happen only sporadically, but are the main form of rebelliousness that clearly and directly involves interaction with the prototype. Other rebellious actions identified in relevant situations mainly revolve around taking/picking up or touching interactive blocks in a structure, when it can be assumed that this interferes with the wishes of others.

additionally, there are also other activities that can be seen as rebellious, which solely revolve around the interactive blocks. These have to do with the possession and gaining possession of these special blocks. It is

apparent that most of the participants are interested in having these blocks in their possession, which is discernible not only from their actions, but more so from various participants expressing this wish verbally. However, there is only a limited amount of these interactive blocks and furthermore, as it appeared to be, these blocks would regularly be predominantly controlled or kept in the possession of a few participants. This is especially apparent in session 1, where two participants remain largely in control of the respective interactive blocks throughout the session, while the the rest repeatedly ask for and/or try to take the interactive blocks from them. More generally speaking, it was apparent that interactive blocks do not often simply change hands when already in someones possession or control. This shared desire to get an interactive block appeared to be a continuing source for acts of apparent rebelliousness, where participants would repeatedly (try to) take these blocks into their own hands, regardless of who had them before. As well as acts seemingly intended to prevent or deny others from doing so, which at times would interfere as well with the activities or apparent wishes of others. For example, these blocks would get snatched while the other is not paying attention, they would get blatantly taken off of constructions belonging to others, there would be (attempts to) forcefully take blocks out off the hands of others, especially when the other is trying to prevent that from happening in oder to keep the block for themselves. Furthermore there were instances where it seemed that not being able to get a block from someone would result in loudly screaming at the block, as well as instances where blocks would get hidden, seemingly to prevent others from getting a hold of -, or playing with it. Besides rebellious acts for control of the interactive blocks, stealing or scavenging regular blocks from other groups with more building material also occurred from time to time.

additionally, there were some instances, involving building activities, where the constructions of some players were blatantly pushed, kicked or smashed in by someone else, seemingly without much reason. There were also frequent other activities that were (at times) seemingly disruptive to the play session overall. Either involving the prototype, using the blocks in a way they were not intended for; e.g. by kicking them, playing football with them, throwing them around, throwing them at each other and intentionally destroying cardboard blocks. As well as unrelated to the prototype, e.g. by running around, play fighting, using play equipment that they aren't supposed to play with, standing in front of-, as well as messing with the the cameras, and generally fooling around and making a scene.

With these activities, there are generally no clear signs that they is some premeditation or that they are preceded by any specific plans sabotage or revenge. They are mainly seemingly spontaneous incidents including one or more individuals, instead of deliberated, organized group acts. It seems that these participants are mainly just making a playful ruckus.

Due to the general absence of the moment of choice or conflict of interest between building and destroying, there was not really any rebelliousness to be discerned that that came forth from it. This circumstance was envisioned to be the key cause/prerequisite for how rebelliousness was supposed to happen, because of playing with BlockMe. However in reality, this cause and effect did not actually follow each other. Because other instances of rebelliousness that were identified, did not result from this proposed principle and also did not really evolve further as envisioned, their relation to BlockMe was much less clear. This made it so, that even these few instances, that were identified as being caused by BlockMe, are considered to only bear a slight resemblance to what was intended for rebelliousness to be. These acts were mostly only in some sense rebellious, and mostly missed the complexity of what was aimed for. Acts that have some apparent cause and/or motivation relating to earlier moments (e.g. resulting from the opposite possibilities for play), deliberate target (e.g. others you were previously cooperating with, who want the opposite from what you want), and some purpose to the them (e.g. sabotaging or obstructing others). However, the the rebellious acts identified as resulting from BlockMe, as well as otherwise occurring activities that might be considered rebellious, where by and large what appeared to be incidents, instead of developing events, without much additional complexity to them. This made it ofter hard to discern who, if anybody, these acts were going against. There is really only one noticeable exception to this, which is the first situation of the first session. Only in this case, from the relevant situations identified, is there a clear apparent cause (being denied possession of an interactive block), target (the girl who took the block), and intent (messing with, or disturbing what she is doing). Furthermore, there even appears to be a moment of contemplation and on top of that she even involves another player in her scheme. moreover, she clearly and very consciously makes use of the functionality provided by the prototype for her rebellious deed, by asking the other

to yell at it for her. Even if this is not exactly how rebelliousness was intended to happen, it is very much in the spirit of the kind of rebelliousness BlockMe should elicit; playfully scheming (together) and messing with fellow players, while also standing up for oneself. For this to happen, play with BlockMe has to evolve further than series of incidents, as it somewhat happened in this occasion. This is the case in this stage of play, but should (unlike now) already start from the moment building begins. A possible explanation, of why this case of notable rebelliousness happened here, and not in other instances, is (besides chance) that this first session was one of the only times, where there were multiple children who would fairly consistently play together and with the prototype and who would relatively structurally engage in building activities, making moderately diverse and elaborate structures. There seemed to be a bit more general patience and/or genuine motivation/interest to engage with the prototype, which was lacking in the other sessions. In turn, it was perceived that this led to a greater number of more intricate interactions between players as well as the prototype, as well as relatively many occurrences of notable play, generally and the largest amount of relevant play situations, from any session, identified specifically as well. The believe is, that this is the type of play that is necessary and needs to be further stimulated, in oder to create a situation where these instances of more elaborate rebellious (and other) play can emerge/flourish.

Besides these occasional instances of rebellious play, revolving around construction activities with the prototype, there was a notable amount of seemingly rebellious play that emerged from the desire of many players to possess/ control one of the scarce interactive blocks. More so, than rebelliousness emerging during intended play with the prototype, it seemed that rebellious acts mainly would revolve around gaining and keeping possession of interactive blocks. Even tough this effect that the interactive blocks had was completely unforeseen, it interestingly enough did appear to lead to an alternative way in which rebelliousness might happen. It appears that the scarcity of these blocks, combined with their unique nature, creates a demand where everybody wants to get hold of them. Even if it is merely for the sake of having them, it seems that children will often strive to take possession of the special blocks. This is apparent from the fairly limited amount of instances where interactive blocks are actually used for what they are intended (in constructions), as well as from the general observation that participants will regularly not actually do much with the interactive blocks blocks once they have them. The interesting thing is, that in this way a difference is created between those who possess the blocks and those who do not. Furthermore, besides just being a novelty item to have, possession interactive blocks, quite literally, gives one control the BlockMe game, allowing that player to decide what to do with and when and how to use the block. As the interactive blocks are regularly still inherently used during or after building, this also gives control over the building activity. This sort of power or authority (over others), that some have with these blocks, makes them an ideal and clear target for the others to rebel against. And the will to possess the special blocks for oneself, gives a clear motivation to do so. Furthermore, when losing an interactive block to someone else this often seems to additionally spur attempts to regain control. This all seemed to lead to repeated and playful interactions back and forth, involving multiple players, all seemingly engaging in a competition for the these blocks. Trough this, acts of rebelliousness and resulting conflicts (and vice versa) seemed to emerge, with some frequency. An many ways this is quite similar to what was intended for BlockMe to happen, and these mechanisms might provide a promising foundation for further design for rebelliousness.

Conflict

Some instances of conflict were discerned in the relevant play situations, where in 11 of the 38 situations identified some form of disagreement or confrontation was observed. In these instances conflict would relate or revolve around the prototype in one form or the other. In most of these situations there would also acts that were considered to be rebellious. Regularly conflicts in these cases would involve some form of physical contact, e.g. pushing another. Besides these instances, when participants were engaged in block play with the prototype, play seemed to be generally calm, agreeable and cooperative. More so, confrontations involving the prototype notably seemed to revolve predominantly around strife regarding possessing, gaining possession or being denied possession of the interactive blocks, which led to repeated altercations (back and forth) between players. Similarly, there were also some instances of altercations happening as a result of players stealing or scavenging regular building blocks from others as well. Besides this and some other unrelated moments of roughhousing with the blocks (e.g. throwing them at each other, or forcing over another's structure), there appeared to be

predominantly commotion unrelated to the prototype, which more so seemed to emerge simply from children playing with each other.

Overall, these moments of conflict appeared to be playful, a part of play for the children, and where mostly limited to things like disagreements/bickering between children and teasing or playfully provoking each other, as well as play fighting/wrestling. At times, there where instances where a conflict seemed to get a bit more heated or serious, but in the end conflict never amounted to play ending and always quickly appeared to worked itself out.

It appears that rebellious behavior, in many cases, does lead to instances of conflict, as well as the other way around. Especially when someone dictates what another can or cannot do. Generally, there were frequent confrontations throughout the play sessions, Many of these seemed to emerge spontaneously from regular play. Although, it is believed that block play, e.g. the presence of building blocks, even apart from the interactive ones, played a considerable role in the emergence of conflicts as well, by giving the children something to argue about and a means for acting out. Confrontations did fairly regularly include physical contact, more so than (heated) argument. This seemed to be especially the case with more overt and inconsiderate (rebellious) actions. When these actions seemed to be of a more joking, playful nature, it often didn't lead to (much) further conflict, seemingly as it is understood as a part of play. Generally, all these conflict seemed quite amiable and playful, understood as part of playing. It never seemed to come close to escalating further than that. Furthermore, it was found that the children where mostly quite considerate towards each other.

It appears that rebellious behavior, in many cases, does lead to instances of conflict, as well as the other way around. Generally, there were frequent confrontations throughout the play sessions. But, because the proposed BlockMe game never much evolved, these conflict only somewhat followed from play with the prototype. In these cases, either they followed from the number of rebellious actions using the functionality of the prototype (in the relevant situations), or they revolved around the possession of the interactive blocks. In many other cases, small confrontations seemed to emerge spontaneously from regular play. Although, it is believed that block play, e.g. the presence of building blocks, even apart from the interactive ones, played a considerable role in the emergence of conflicts as well; by giving the children something to argue about and a means for acting out. Generally, all these conflicts did seemed quite amiable, understood as part of playing, although this did not seem to be out of the ordinary. Of truly playful conflicts - in the sense of conflict as a sort of game, fun activity, or enjoyable friction between players, which might even be a reason for playing with BlockMe - there were some notable instances discerned in the relevant situations, as well as instances revolving around the possession of the interactive blocks.

All in all, even tough it hasn't fully come to fruition, it is tough that there is some considerable potential for BlockMe to stimulate playful conflict.

Interplay

Instances of interplay, as described, between children playing with the prototype did not appear. Moreover, there is hardly any calming / stroking of interactive blocks to speak of, and certainly not in an interplay where one player wants to destroy what another wants to preserve. Even relevant instances of play with the prototype never leads to this.

The only notable form of interplay that was observed was the strife for the possession of the blocks, in the sense that children would, repeatedly and back and forth, try to take the blocks from each other, in what could be considered a kind of competition that the children seemingly liked to engage in.

This kind of competition is the element, which was hoped to be observed, that would make BlockMe truly a game and more than merely building and destroying, as most of what is seen is now. However this interplay did not even remotely appear to be happening. As with the other segments, there are too many prerequisites missing for it to emerge.

There seems to be no interest in calming/saving a tower. The novelty of the prototype is that it can shake and destroy towers, which is is what, therefore, everybody wants to experience. This makes it so, that there is just no need or incentive to calm an interactive block when destruction is imminent. Even if this was not the case, there

does not seem to be much other reason to save a building: The structures are not big or elaborate, no extended period of time was put into it and one can quickly start over again. Furthermore, the interactive blocks are mostly not incorporated into the tower. When this is the case the interplay can not really happen; when a block is placed on a tower in the end, it is already decided and/or too apparent that destruction will happen. This leads to a diminished incentive for a back and forth between players. Additionally, because it is necessary to be loud to activate the blocks, the rebellious act is immediately apparent and can be immediately be confronted. This leads to a confrontation (mostly pushing was observed), after which the incident is, for the most part, concluded and no further interplay can emerge.

However, something notable that did appear, emerging from playing with the prototype, that could be considered interplay, was the competition for the possession of interactive blocks and the resulting rebellious behaviors and conflicts.

Destroying

Destroying constructions using the interactive blocks seemed to almost always be the (intended) end result and main motivation for building with the prototype. Certainly so in the situations of relevant play. Destroying/ triggering the blocks would generally happen collectively and, more so than with building, all participants close by would join in the destruction activity. This would exclusively be done by yelling at the interactive blocks in order to trigger them. Often the interactive blocks would be kept separate, instead of being incorporated into the construction, while building. Only to be placed on top of the tower when it was deemed ready for destruction. The interactive blocks going off, shaking, would regularly not lead to the (complete) collapse of a structure. When this happened, it would often lead to playfully kicking or pushing over the structures instead. Notably, when structures would collapse it would regularly be used as an opportunity by players to opportunistically get hold of interactive blocks hidden in the rubble, for instance with players leaping at them in the commotion.

Resolving

There where some instances observed of apparent resolving after conflicts happened (as one might expect normally.) Regularly this happened not explicitly in a verbal way, but seemingly more implicit by showing apparent remorse trough actions. For instance by helping with building afterwards, or returning stolen blocks. Ultimately, there is often no clear moment of resolvement and the conflict would appear to simply fade away. Destroying was the end result of most building activities and did appear to create an exciting and fun spectacle for the players. It is the main point of distinction of BlockMe, in comparison to other construction sets, and indeed this novelty appears to be the main motivation for participants to engage with the prototype. This possibility did certainly seem to invite continued and prolonged construction play - it seemed to lead to repeated, iterative building and exploration to an extend that, is believed, would not have happened otherwise. Even if the engagement with the prototype, at least as intended, was not that considerable.

Additionally, In cases of conflict, destruction did often appeared to resolve them, seemingly because of the (fun) distraction and excitement it would cause.

In this sense destruction seems to mostly lead to what was intended, if not being, perhaps, too much of a point of focus for players.

Other

There were also other imaginative ways of using the interactive blocks, for instance; making them blocks fall off various other obstacles. There was also a notable hide and seek game with the interactive blocks. They were placed amongst the rest of the blocks by one of the players, after which the rest were meant to trigger them by yelling and then quickly find them. Another notable activity was participants, for one reason or the other, hiding the interactive blocks. At some point a semi-covered hole was discovered somewhere on the playground, into which multiple blocks were placed by a number of participants in what seemed to be some kind of game. There was an instance where two groups of players agreed to compete on who could destroy their tower first using the interactive blocks. Furthermore, there was multiple instances of participants expressing interest in seeing what is inside of the interactive blocks, and how they work, as well as children making up various stories about about

what they might be. Generally, it seemed that often many of the children enjoyed simply playing/exploring together with the blocks without building, making op various things to do with them

In contrast to the expectations, often there were no apparent moment of resolving conflicts between children, instead conflict situations would just fade away. When there were apparent instances, resolvement seemingly happened mostly trough actions, rarely verbally, trough conversations or negotiations. Therefore, in some cases there where signs, albeit not very clearly, that children, confronted with conflict, seemingly may have reevaluated their behaviors in some way. Though mostly, there were not any clear signs of this and it certainly did not did not lead to any profound direction changes in the play activity. Often there just seemed to be no need for resolvement of any extend, as generally things did not get so serious, that the situation required it. Furthermore, children generally appeared to be quite considerate towards each other. Considering the intention of providing children with the possibility to explore, in a safe and playful setting, how to deal with situations of conflict and the consequences of ones choices: If play with the prototype would have structurally allowed for repeated and controlled (as in, emerging from the design) conflict to happen there might be some merit to this possibility, but for now it remains unclear that playing with BlockMe provides any additional means over regular play, except for, possibly, stimulating some more conflict to begin with.

contributions of the BlockMe

Overall, the contributions of the prototype to the emergence of the intended behaviors are hard to substantiate. Generally speaking, I am of the opinion that there is some merit to the way BlockMe is supposed to work when looking at what was observed. But to what extend BlockMe had a real effect on the play behavior of children, and in what part the behaviors, perceived as resulting from BlockMe, merely emerged by change cannot be clearly stated as a result from this study. As well as if BlockMe could work conceptually at all. What is clear is that the current prototype did not perform is was hoped. In the following segments it is deliberated what aspects of the design did appear to contribute as intended, and what parts might have hindered, or even counteracted the actualization of the BlockMe concept.

Opposite possibilities for play

The opposite possibilities for play; to either keep building or opt for destruction, do not currently seem to be perceived as such and are not be sufficiently reflected or contrasted in the current prototype. This is thought major reason why the BlockMe concept simply does not currently deliver.

It could be argued that there hardly is a choice to make, currently. Because of the seemingly the mundane building activity the prototype provides, in contrast to the novelty of the destructive capabilities of the prototype, the choice to build becomes just a necessary prerequisite to be able to destroy. The choice for continued building is no match for the appeal for destruction, of making use of that what makes the prototype so different. There is, therefore, clearly no (inner) struggle between the two. Destroying is not that an urge arrises individually, sooner or later, during building, more so it is the intent from the start, for all involved.

Furthermore, this novelty seems to have such some appeal that players skip building altogether, instead choosing to play with and explore the interactive blocks on their own. This usage, of playing with the interactive blocks on their own, may have prevented other from using the blacks as intended intended, during building activities more often.

On the plus side, it appears that destroying with the prototype, and overall making these blocks do something unexpected, is attractive game element for these children. But evidently, it appears that too much focus has been put on the destructive aspect of BlockMe, while not considering the contrasting, but evenly essential building activity enough.

Making alternative conduct feasible

To me, playing with the BlockMe prototype did indeed seem to give children a certain additional freedom to act in ways they might not normally. Certainly in this case, the prototype provided children with an activity that, not only explicitly allows them to destroy something, but where that is actually, at least perceived to be, the main intention of the game. By letting children intentionally destroy something in this way, they appeared to feel free

to do other things as well: Apart from destroying structures as intended, there were notable, repeated cases, where, for various reasons, towers were destroyed by hand. To me, this clearly appeared, often times, to have been inspired by (earlier) destruction activities with the prototype, as well as unlikely that this would been done, in the same fashion, in another scenario. Similarly, it is my impression that a lot of the rough handling of the blocks, e.g. kicking, throwing and even smashing them, followed, as well, from a realization that it is allowed to play rough with the blocks, exemplified by the fact that blocks falling over is an inherent part of the game. Furthermore, there were clear instances where initially reserved/shy children would increasingly let loose, as their session progressed. Seemingly encouraged by a realization that this, perhaps, naughty behavior is allowed, as well as seeing others who are doing so and wanting to join in.

The same can be said for the necessity to be load while playing with the prototype. This lead to a lot of additional shouting in general and seemingly created some additional excitability, which I think contributed as well to the emergence of these, and other alternative behaviors.

Although I propose there is an apparent contribution to the emergence of alternative forms of conduct, it is difficult to judge the effects. The question remains to what extent these behaviors where influenced by the BlockMe prototype specifically. The mere presence of a new toy/activity, as well as the play sessions being an unusual event for the children, might have added to their excitability as well. Furthermore, the lack of supervision from their usual supervisors likely allowed for additional freedom of conduct as well.

Although the shapes of the nature of the blocks otherwise might also be of influence. They're lightweight, unstable etc. While also apparently problematic for producing an engaging building experience, these aspects could can on the other hand also be considered for stimulating this behavior.

Het is van belang dat begeleiders op de hoogte zijn van de bedoeling van het spel, ook om die vrijheid te kunnen geven. In die zin kan een rebels spel niet alleen kinderen helpen meer rebels te zijn, maar ook begeleiders helpen om ze deze ruimte te geven. Sowieso doordat het spel bepaalde dingen al toelaat die ze dan niet meer kunnen verbieden, maar ook door ze bewust te maken van de bedoelingen waardoor ze wellicht een oogje dicht kunnen knijpen.

The Countdown process of the 'time-bomb'

Prolonged moment of choice

The countdown process was described as a 'prolonged moment of choice' during which de choice of another, to either or rescue a structure, can be cancelled. Doing so back and forth would create an interplay between the players with opposite intentions for playing. In reality, no such thing happened during the countdown process. There was no sign that children wanted to diffuse the blocks during this process (except in a few occasions, to calm blocks that where triggered by ambient noise) or even that they had considered it as a thing to do. Because players were mostly working together, the countdown mainly led to them awaiting the eruption of the blocks, as well as to additional shouting until it would do so. The biggest contribution factor in that sense is that it seemed to add an element of anticipation to the process. Furthermore it meant that participants who noticed the shouting from others, had some time to come over and join in or interfere, which resulted in some behavior that can be seen as rebellious as well as some small moments of conflict.

More so though, I think the countdown process in the current prototype meant an apparent lack of clear and direct feedback. An apparent reason for this delay to be there, did not seem to be perceived. Instead, it seemed to lead to unclarity about the prototypes functioning and confusion about weather or not it was even functioning properly. This confusion of even frustration might have been a contributing factor to the lack of play with the prototype.

<u>Block shapes</u>

Block Play as a conformist activity

Providing blocks to play with did indeed lead to collaboration and groups to form. Although these groups did, on occasion, seem to provide an entity to rebel against; sometimes by a member, sometimes by an outsider, more often players just collaborated and conformed together. Although it was expected that all children would play together with the prototype in, more or less, a single group, in reality they played much more fragmented. Multiple smaller groups would form, in which some would be more involved than others. Additionally, many children played much more individually and often times, even if they were playing somewhat together, they did not actually play as a group (e.g. with common goals etc.). the way the children played together and formed groups is problematic, because the BlockMe concept assumes the formation of somewhat larger groups, that engage in play together with the prototype for a longer period of time. It is tough that in such groups certain prolonged group dynamics can emerge, that are expected to be necessary for the BlockMe game to properly work.

Attaching value to a creation

It is clear that the children attached no real value to their creations they had build, certainly not enough engage in any interplay, or effort otherwise, to try and stop their creation from being demolished. There was just not enough prolonged engagement in building with the prototype, for this to possibly happen. There were no elaborate, grand construction created, that might require some notable effort to make, of which the makers could feel truly attached and proud. When introducing the BlockMe concept, building (elaborate) sandcastles or even huts are named as an example, but the prototype does not actually seem to lend itself for that at all. Instead, building with the prototype results in quick and dirty structures and does not seem to capture the imagination of the children in a considerable way. The lack of captivating possibilities and variety for construction play with the prototype is a big problem for the emergence of any further behaviors to happen, as this is an important prerequisite.

Although not to their creations, players did often seem attached to executing their activity and/or plan. when someone interfered with what another was doing, this could, from time to time, lead to confrontations. In this sense block play did create something of value for the children, which could illicit further interaction between players (albeit often not using the prototype), and lead to some of the relevant things that were seen during the study.

<u>No prescribed rules</u>

Free play activity

In the end it has proven difficult to guide the open ended play activity that BlockMe provides. At least this prototype has not proven to be sufficiently of influence to lead to the structural emergence of intended behaviors and specifically rebelliousness. The vision was to provide free activity, but with all the elements for rebelliousness to happen. But as it has turned out, many of these separate aspects of the BlockMe design do not lead to the desired outcomes. Therefore, it remains unclear if an open ended construction-play activity (with destructive elements) could be utilized to this extent.

Functioning of the prototype

Appearance

The appearance of the blocks seem to contribute to some of the confusion while playing with BlockMe. The interactive and non-interactive blocks all look the same, and on top of that their appearance is quite ambiguous with their nondescript white color and abstract shape. They do not give much away about their functioning. In general, they might not necessarily look like they are meant for building and especially the interactive blocks show no real hint of the interactions it affords. Initially, the blocks were designed to all look the same. This was

meant to make sure nobody would know upfront which block is which, and so that the interactive blocks would be, initially, handled and incorporated into the structure as normal blocks. In reality, what this was meant to prevent, more or less happened anyway: Because children could still tell the blocks apart (e.g. because of their weight and slightly different colored stripes), they could still treat the interactive blocks differently. for instance, by keeping them apart during building. Therefore, this design decision mainly had averse effects by obscuring the functionality of the interactive blocks, while not even properly hiding them amongst the others. What the homogeneous appearance of the blocks did lead to, was repeated exploring and searching for the interactive blocks amongst the other blocks, which appeared to be an enjoyable activity for the children.

Additionally, it was not expected that the appearance of the blocks would have been of influence for the regular building activities with them, their alternative look was actually expected to make them more enticing. But in the end, I think that the esthetic choices for the somewhat minimalist look, white blocks and clean lines, might actually have made them less inviting to build and play with. Especially when compared to, for instance, colorful lego blocks in different shapes and sizes.

shape and size

The shape and size of the blocks did not appear to properly lend themselves for an engaging building activity, as well. Although two of the edges of each block was chamfered to provide additional ways of stacking them, the blocks didn't appear to allow for too much diversity in building. Even tough there was some variation, the use of the prototype was mainly limited to a certain kind of building; predominantly in the form of towers, stacked in various ways. Certainly when compared to the activity of building of sandcastles or even huts, as mentioned in the vision of the concept (p.10), play the prototype does not come close to this complexity, variety and engagement in building. The limited amount of blocks probably hindered the creation of more elaborate creations as well, especially considering the fragmented way the children played with the prototype. Additionally, the uniformity in shape of the blocks might have hindered more imaginative building, compared to a more diverse set of shapes and sizes.

Finally, because of their shape and light weight, the blocks appeared to be too unstable to confidently build for longer periods of time. Often creations would collapse before being finished, merely because they were too unstable. This appeared to have contributed, as well, to the short building times and simple constructions. Children regularly appeared to build carefully and quickly; making sure that they could use the interactive blocks for destruction, instead of a creation collapsing on its own. Paradoxically, there where also often moments where structures were build in such a way, that the shaking of the interactive blocks did not have any effect on it at all. By being both unstable too easily build with while also, at times, too stable to be destroyed, the embodiment of the blocks struck a less than optional balance.

Interactions

When designing BlockMe the interactions were mainly chosen from an experience, more than a usability standpoint. For instance; making noise was chosen to trigger the block, as it was thought that that would add to a more rebellious experience. It is not something that is often encouraged and already somewhat unruly to do. Furthermore, it fitted into a narrative where the noise would wake up the block, making it angry. The stroking interaction, in contrast, was merely meant to contrast that; a calm action that would put the block back to sleep. Because of this, these interactions were thought to be intuitive, but in reality it often did not seem clear to the participants how the prototype was supposed to function. A part of the problem may lie in the fact that the prototype does not give any indication of the possibility of these ways ways of interacting; it does not afford them. This is especially the case for stroking/calming the prototype, which was not often seen. It seems as if many might not even have known that this was a possibility. Furthermore, this lead to confusion when participants tried to trigger the block, while also holding it in their hands (which was often tried). Because the two interactions cancel each other out, nothing would happen. Because this was not clear for the children, it appeared to be unexpected behavior to them, as if the prototype was not working properly.

Additionally, it appears that the feedback that the prototype gave was not direct and sufficiently clear enough. It seemed that the children did not notice, and/or understood the meaning of, the light and sound feedback. It often only appeared to become clear, weather or not they had successfully triggered the interactive block, when it

would actually go off eventually and start shaking. Until that time, the participants often seemed to be uncertain if the prototype was working at all, no matter if they had, or had not, actually triggered it successfully. This also often lead to the interactive blocks going off and destroying structures unintentionally, when participants did not appear to notice, or understand, that a block had been triggered by ambient noise.

All these things may have contributed to, what might have seemed like, unpredictable behavior of the prototype and confusion about its functioning.

Furthermore, yelling as an interaction seemed to lead to additional problems. Firstly, because an act of sabotage is immediately apparent this way, it will be immediately confronted as well. This way you can only rebel overtly, which might be a hurdle for some. Furthermore, when a rebellious act is immediately and openly confronted (which, in this case, often lead to pushing) it appeared to immediately end the situation, instead of, perhaps, leading to more interplay. Furthermore, although this was not necessarily seen in this study, stroking the blocks, to calm them after an act of sabotage, is a much more precise and directed action, whereas the rebel can easily just continue yelling to cancel that out again. In this sense, there is probably not a good balance between the two, which might make an attempt to save a building a less attractive (maybe even futile) option as well, compared to joining the destruction.