Table 1: *Set emotion requirements with their formulation as* EmoSTL *specifications.*

No.	Emotion requirements	EmoSTL **formalization**
Participant1		
R1	Every player would feel excited at the beginning of the game, in area P.	valid $\phi = \text{seq}^{[0,b]}$ [$P.Exct'$] , where $Exct'$ refers to excitement increase in the collected trace and $[0,b]$ is the duration considered to be the beginning of the game by the SE.
R2	Every player would feel anticipation on how to go through the fire in area G without dying as well as if it is worth to press the button in that area.	valid $\phi = \text{seq}$ [G] $\rightarrow$ seq [G ; $G.(Antcp' \wedge hp > 0)$] where $Antcp'$ refers to anticipation increase and hp is the health point which must be greater than zero for the player to remain alive.
R3	Every player would feel a bit worried about going through area G, since there is fire there.	valid $\phi = \text{seq}$ [G] $\rightarrow$ seq [$G.Wry'$] , where Wry' refers to emotion worry increase in the traces.
R4	There is at least a game-play in which a player would feel hopeful to complete the game as soon as they reach room F2.	sat $\phi = \text{seq}$ [$F2$; $F2.H'^{\sim[0,b]}$] , where H' refers to the hope increase in the traces and b is some reasonable upper bound time that is decided by SE to capture "as soon as".
R5	There is no game-play in which a player would feel a bit disappointed after walking for a while in rooms P, G and F1.	unsat $\phi = \text{and}($ seq[P], seq[$F1$], seq[G], seq[P'] $)$, where P' refers to the disappointment increase in the traces.
Participant2		
R6	When every player begins playing the game, they should be pleased to accomplish something right away like pressing a button (*b*0 or *b*1).	valid $\phi = \text{seq}$ [$(pressed_{b0} \vee pressed_{b1})^{[0,b]}$; $Plsd'^{[0,c]}$] , where b and c represent specified upper bounds on the time considered as the beginning of the game (right away) by SEs, $pressed_{b0}$ and $pressed_{b1}$ are status of buttons and $Plsd'$ refers to an increase in pleasure emotion in the traces.
R7	Every player should feel a sense of fear as well as joy at least once in the whole game even if they lose the level fairly quickly.	valid $\phi = \text{and}($ seq [$\mathbf{J'}$], seq [$\mathbf{F'}$] $)$, where $\mathbf{J'}$ and $\mathbf{F'}$ are the increase in joy and fear in the traces.
R8	There is a game-play in which the player keeps hopes that fire flames in room G can be avoided easily.	sat $\phi = \text{seq}$ [G ; $\text{sustain}(G.h > 0)$; $\neg G$] , where h refers to hope variable in the traces. Note that the fire flames are the only elements within room P that, when touched, changes the level of hope in a player to win the level.
R9	In every gameplay, the user should face a small challenge in area F1 to feel scared before they face the horde of zombies in F2.	valid $\phi = \text{seq}$[$F2$] $\rightarrow$ seq[$F1.F'$] , where F' refers to the increase in fear in the traces.
R10	There is at least one game-play in which the player should pass a challenge to reach a closed door *d*1 and within the next 10 seconds realize that they need to come back and feel nervous.	sat $\phi = \text{seq}$[$closed_{d1} \wedge reached_{d1}$; $Nrv'^{[0,10sec]}$] , where $closed_{d1}$ and $reached_{d1}$ are $ordinary-variable$ in the traces indicating the $d1$ is closed and the player reached nearby the door. $Nrvs'$ refers to the increase in nervousness in the traces.

Table 2: *Set emotion requirements with their formulation into* EmoSTL *specifications.*

No.	Emotion requirements	EmoSTL formalization
Participant3		
R11	There is a game-play that passes room G and the player will not feel frustration.	ϕ sat $=$ and(seq[G], seq[absent $G.Frust'$]) , where $Frust'$ is the increase in frustration emotion in the traces.
R12	In at least one game-play, a player will be confused and disappointed after pressing the button at the bridge in room G which controls the door between rooms G and F1, if they have not learned yet that pressing a button twice will close the door again.	sat ϕ = seq[$\neg pressed_{bBridge}$; $pressed_{bBridge}$; $\neg pressed_{bBridge}$; ; $G.Conf' \wedge G.P'$] , where $pressed_{bBridge}$ refers to the status of the bridge button ($ordinary-variable$), $Conf'$ to confusion and P' to disappointment in the traces.
R13	Some players will feel delighted when they pass through the fire in room G and gain their health back by interacting with a healing flag in room P.	sat$_c$ ϕ = and(seq[$G; interacted_{flagp} \wedge$ HP'], seq [$P.\mathbf{Deltd'}$]) , where $interacted_{flagp}$ is the status of the specific flag ($ordinary-variable$), HP' refers to the rise in health point after the last state, $Deltd'$ is the increase in emotion delight in the traces and c is the ratio of traces that need to satisfy the specification.
R14	Some people may feel fear when encountering the zombies in room F1.	sat$_c$ ϕ = seq[$F1.nearEnemy; F1.F'$] , where $nearbyEnemy$ shows whether the player got close to the enemy and F' is the increase in the fear variable in the traces.
R15	Some players will not feel dissatisfied with the challenge posed by the zombies.	sat$_c$ ϕ = always ($nearEnemy \rightarrow \neg \mathbf{Dissat'}$) , where $nearbyEnemy$, where $nearbyEnemy$ shows whether the player got close to the enemy and $Dissat'$ show an increase in dissatisfaction emotion in the traces.
Participant4		
R16	Players always feel a sense of fear when faced with the zombies in room F2.	valid ϕ = always ($F2.nearEnemy \rightarrow$ seq [$F2.F'$]) , where F' is the increase in the fear variable in the traces.
R17	The player never feels a sense of amusement when hearing the sound effects or reading the message boxes above player and enemies.	valid ϕ = always ($soundnotification \rightarrow \neg Amus'$) , where $soundnotification$ refers to the status of the presence of sound effect or the presence of new message and $amus'$ as amusement increase in the traces.
R18	If the player first moves towards F1 via corridor GF1, and meets the closed door there, they will typically feel anticipation for going the other way, finding out how to open this door.	valid ϕ = seq[$GF1 \wedge closed_{doorF1}$] $\rightarrow$ seq[$GF1.Antcp'$] , where $closed_{doorF1}$ refers to the status of the door and $Antcp'$ is an increase in anticipation emotion in the traces.
R19	Some player always feels joyful when reaching the finish flag alive.	sat$_c$ ϕ = seq[$Finish \wedge hp > 0 \wedge J'$] , where $Finish$ is the status of the game, hp is the health point and J' is the increase in joy field in the traces.
R20	Some players feel nervous when traversing the maze in room G.	sat$_c$ ϕ = seq[$G.Nrvs'$] , where $Nrvs'$ refers to the increase in nervousness in the traces.

Table 3: *Set emotion requirements with their formulation into* EmoSTL *specifications.*

No.	Emotion requirements	EmoSTL **formalization**
Participant5 (Dry-run)		
R21	Every player feels decreasingly anxious every time that they pass room G	It can not be expressed because the DSL has no mechanism to refer to an arbitrary past-state.
R22	Every player feels nervous when they enter room F1 for the first time.	valid $\phi = \text{seq}[F1] \rightarrow \text{seq}[\text{absence } F1 \,;\, F1 \,;\, F1.Nrv']$, where Nrv' is the increase in nervousness emotion in the traces.
R23	For all gameplays, the player feels more nervous for the first time that they pass room G compared to their first time in room F1.	It can not be expressed because the DSL has no mechanism to refer to an arbitrary past state.
R24	For at least one gameplay, the player feels happy when they are in room F2.	sat $\phi = \text{seq}[\,F2.Hpy'\,]$, where Hpy' refers to an increase in happiness.
R25	There are no gameplays where the player feels hopeless in room P.	unsat $\phi = \text{seq}[\,P.h \leq 0\,]$, where h refers to hope variable in the traces.