

# Validation of Ludic-Quest to the playfulness of health games: gameplay and emotions on the field

*Validação do Ludic-Quest à ludicidade de jogos na saúde: jogabilidade e emoções em campo*  
*Validación de Ludic-Quest a la ludicidad de los juegos de salud: jugabilidad y emociones en el campo*

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## ABSTRACT

**Objective:** to validate Ludic-quest construct and reliability to assess game playfulness, through latent factors in gameplay, perception of learning and emotions in the game. **Methods:** a cross-sectional study to validate the instrument's psychometric properties. 247 people responded to the questionnaire after a match in the game *Violetas*. Exploratory Factor Analysis, using KMO (>0.7), Bartlett ( $p=0.005$ ), Varimax and factor loading (>0.6). Reliability by Cronbach's alpha (>0.6). **Results:** in gameplay/learning, KMO=0.859, Bartlett significant. The eigenvalue indicated four factors (reflections; immersion; challenges; aesthetics), 10 retained variables. In the factor analysis of emotions: KMO=0.817; Bartlett  $p=0.000$ . Extraction of four factors (pleasure; *ostranenie*; tension; fun), 10 retained variables. The 20 validated variables contain reliability (Cronbach's alpha=0.716). **Conclusions:** the eight validated factors centralize playfulness in health game production, composing a reliable playfulness assessment instrument for use in research.

**Descriptors:** Validation Study; Factor Analysis; Play; Learning; Emotions.

## RESUMO

**Objetivo:** validar o constructo e a confiabilidade do instrumento *Ludic-Quest* para avaliação da ludicidade de jogos, por meio de fatores latentes à jogabilidade, percepção da aprendizagem e às emoções na partida. **Métodos:** estudo transversal de validação das propriedades psicométricas do instrumento. 247 pessoas responderam ao questionário após uma partida do jogo *Violetas*. Análise Fatorial Exploratória, com uso do KMO (>0,7), Bartlett ( $p=0,005$ ), Varimax e carga fatorial (>0,6). Confiabilidade pelo Alfa de Cronbach (>0,6). **Resultados:** na jogabilidade/aprendizagem, KMO=0,859, Bartlett significativo. O autovalor indicou quatro fatores (reflexões; imersão; desafios; estética) e 10 variáveis retidas. Na análise fatorial das emoções: KMO=0,817; Bartlett  $p=0,000$ . Extração de quatro fatores (prazer; *ostranênie*; tensão; diversão) e 10 variáveis retidas. As 20 variáveis validadas contêm confiabilidade (Alfa de Cronbach=0,716). **Conclusões:** os oito fatores validados centralizam o lúdico na produção de jogos na saúde, compondo um instrumento de avaliação da ludicidade confiável à utilização em pesquisas.

**Descritores:** Estudos de Validação; Análise Fatorial; Jogo; Aprendizagem; Emoções.

## RESUMEN

**Objetivo:** validar el constructo y la confiabilidad del instrumento Ludic-Quest para evaluar la lúdica de los juegos, a través de factores latentes en la jugabilidad, percepción del aprendizaje y emociones en el juego. **Métodos:** estudio transversal para validar las propiedades psicométricas del instrumento. 247 personas contestaron el cuestionario después de un partido de *Violetas*. Análisis Factorial Exploratorio, utilizando KMO (>0,7), Bartlett ( $p=0,005$ ), Varimax y carga factorial (>0,6). Confiabilidad por Alfa de Cronbach (>0,6). **Resultados:** en jugabilidad/aprendizaje, KMO=0,859, Bartlett significativo. El valor propio indicó cuatro factores (reflexiones; inmersión; desafíos; estética) y 10 variables retenidas. En el análisis factorial de las emociones: KMO=0,817; Bartlett  $p=0,000$ . Extracción de cuatro factores (placer; *ostranenie*; tensión; diversión) y 10 variables retenidas. Las 20 variables validadas contienen confiabilidad (Alfa de Cronbach=0,716). **Conclusiones:** los ocho factores validados centralizan la ludicidad en la producción de juegos de salud, componiendo un instrumento de evaluación de la ludicidad confiable para uso en investigación.

**Descriptorios:** Estudio de Validación; Análisis Factorial; Juego; Aprendizaje; Emociones.

## INTRODUCTION

Research in games has been consolidated in recent years with the expansion of journals and the improvement of the scientific field. Reviews confirm the interdisciplinarity and diversity of approaches, which include epistemic and methodological debates<sup>(1-2)</sup>. In the health area, Serious Games for Health (SGH) emphasize the game as an educational tool, in different applications (patient compliance, behavior changes, motivations for learning). These studies, however, remain unrelated to the prioritization of play's disruptive character, as they aim at purposes that are foreign to the game features. In general, SGH distance themselves from investigations about gameplay and imaginative emotions in matches, by investing in protocols with controllable variables, which restrain the playful aspects<sup>(3-6)</sup>.

Certainly, the experiments that imprison the game's libertarian power incur limitations in the generalization of results<sup>(3-4)</sup>. In the same way, the instruments that help in the development of games are scarce, partial and imprecise – the majority focused on participants' behavioral or cognitive effects, although it considers participants' gameplay (artifices that guarantee the playful dynamics) and experience<sup>(5-8)</sup>. These researches could not be different, since playful's unforeseen characteristics tend to escape scientific standardization, in insurgent free enjoyment. It is not by chance that conceptions about the game are equally ambiguous. A review of 60 terms arrived at the multiplicity of undefinitions, classifiable into<sup>(9)</sup>: i - what are the rules; ii - what is its function; iii – if they are artifacts, activities or both; iv – if they are disconnected or in tune with the 'real'; v - what are the players; vi – if they are unproductive or generate something; vii - what is the role of competition; viii – if there are goals or purposes; ix – whether there are relevant phenomena; x- what purposes do they serve.

Furthermore, in order to remain free, unsubmitive, unproductive, inscribed in its own rules, producer of imaginary universes and delimited in space and time, the game tends to circumvent the method. Among its characteristics, voluntary activity is included, not serious and outside everyday life, self-regulated, fictitious, disinterested in the ordinary and capable of absorbing participants in an intense way. In culture, the game transits between the sacred and the profane amidst the party, the ritual, the laughter. In it, dispute and mystery suspend the fixed references of representation of everyday life, subverting it in favor of imaginative freedom<sup>(10-13)</sup>.

Paradoxically, the more playfulness distances itself from the evidence, the more the educational chances expand, through the denial of resigned obedience. For the sake of the insurrection of playful in thinking, we then should switch the focus of investigations in health. Instead of asking about how the game contributes to clinical or learning purposes in participants, we should investigate how to rescue their inventive restlessness. This twist in the search mode seeks to enhance the game's own artifices, freeing it from other purposes as much as possible. Through playfulness, it is more interesting to delve into the resources, languages, regulations, ruptures, estrangements and experiences inherent to playing. In other words, we privilege the playful dynamics' formal procedures (gameplay) and the affections

provoked by them (emotions), to intensify the game. We position ourselves, therefore, as a movement of critical resistance, immersed and dialogical to the epistemic field<sup>(10-16)</sup>.

By privileging the autonomy of play, we include the enterprise limits: the creation of games with themes of interest to health restricts the freedom we claim. That is, the promotion of games aimed at the problems of collectivities presupposes the same coercion of playful to other purposes that we criticize. Aware of the aporia, we only intend to bet on the game's elements to win its thematic content, in a calculation that favors playfulness. We invest, in an unusual way, in measuring instruments that privilege the power of gameplay to intensify the instant, singular, elusive and revealing emotions in players, keeping the finals open<sup>(9-15)</sup>.

The confirmation of latent factors to playfulness becomes necessary in the methodological instrumentation of research focused on the validation of games with social approaches to health, in population studies. The reduction of variables to a set capable of explaining the playful phenomenon favors the elaboration of multiple scales, with valuable uses in the assessment of a game. In this sense, we discuss in this article the Ludic-quest instrument construct validation in the assessment of the playfulness of games in health, focusing on gameplay (mechanics to forge the playful field) and on imaginative emotions (affections provoked by the game)<sup>(9-17)</sup>. The question of this article is: what are the latent factors and valid items regarding the construct in the assessment of the playfulness of games that thematize violence in health?

The study integrates research that assessed the playfulness of *Violetas: cinema & ação no enfrentamento da violência contra a mulher*, modern-style board game, in which players are characters in a network of confrontation with the mission of cooperatively containing the violence that spreads through Brazilian cities named after women. To win, participants need to act strategically to surround the violence on the board, in addition to answering questions to win four tokens (light, voice, welcome, networks)<sup>(18)</sup>.

## OBJECTIVE

To validate gameplay, perception of learning and emotions in matches as expressions of playfulness, through latent factors, and analyze the reliability of Ludic-quest.

## METHODS

### Ethical aspects

The research follows the guidelines of the Brazilian National Health Council (CNS – *Conselho Nacional de Saúde*), being approved by the Ethics Committee of the Faculty of Health Sciences of the *Universidade de Brasília*. All participants signed the Informed Consent Form (ICF).

### Study design

This is a cross-sectional observational study, supported by STROBE, with validation of the psychometric properties of Ludic-quest in the assessment of the playfulness of games with themes

of violence in the health area. The research took place in public and private higher education institutions (HEIs) classrooms in Brasília, Distrito Federal, from October 2018 to June 2019, with recruitment of participants by prior scheduling of matches of *Violetas*. Players were followed up during the game, with clarifications to guarantee the playful atmosphere. We performed construct validation based on the variables included in the dimensions of gameplay and emotions in matches. We verified the instrument reliability, i.e., the consistency with which Ludic-quest measures and reproduces playfulness attributes, through Cronbach's alpha<sup>(17,19)</sup>.

## Participants

The sample consisted of 247 people, including students (n=236; 95%), professionals (n=3; 1.2%) and graduate students (n=8; 3.2%). Eligibility criteria, sources and selection methods were: inclusion of undergraduate students and/or professionals from the network to combat violence against women personified in *Violetas* (law enforcement officers; members of public policy/health professionals; activists in the women's movement; educator(s) and/or researchers(es), who freely agreed to play a match. Women (n=203; 82.2%) and men (n=44; 17.8%) in the areas of nursing (n=191; 77.3%), social work (n=31; 12.5%) and humanities (n=25; 10%; public health, anthropology, social sciences, political science, history) participated. Most were aged between 18 and 30 years (n=224; 90.6%) or above (between 30 and 49 years; n=28; 11.3%). They and they answered the questionnaire after a match of *Violetas: cinema & ação no enfrentamento da violência contra a mulher*<sup>(18)</sup>.

## Instrument

The construction and validation of Ludic-quest content took place in previous stages, in line with the technological production of three board games. The items were prepared based on a literature review and the application of a preliminary version in test groups. This was followed by the closing of items and content validation through analysis by judges with reliability calculation by the Kappa coefficient, Content Validity Index (CVI) and Reliability Index (Reliability, Interrater Agreement (IRA)) analysis. This version of Ludic-quest with valid content resulted in 53 items for assessing the playfulness of health games, applicable using a five-point Likert scale<sup>(20)</sup>.

In a second moment, to give parsimony and centrality to the playful in the assessment of *Violetas*, we prioritized 33 of the 53 items of the instrument with valid content, distributed in the dimensions learning, gameplay and emotions. The criteria for this selection were: i - interdisciplinary theoretical framework; ii - variables validated or recognized in the game production literature; iii - gameplay heuristics; iv - results of research using the Ludic Self-Reinvention methodology. We performed a statistical analysis of the variables of each of the three dimensions, as follows: we compared the three groups of variables (learning, gameplay, emotions) two by two, using the nonparametric Mann-Whitney U test. We verified that there is no difference between the learning and gameplay variables (same group), but these are significantly different from those included in the emotions dimension (another group)<sup>(15,18)</sup>.

In the present Ludic-quest construct validation, we used this version with 33 items, distributed in the reconfigured dimensions after the Mann-Whitney U test<sup>(18)</sup>, namely: a - gameplay/learning (17 variables); b - imaginative emotions in matches (16 variables). The combination of gameplay and the perception of learning in the instrument - under the dimension rewritten as gameplay/learning - is in line with the premise of playful centrality argued for Ludic-quest. Due to space limitations, we will present only valid variables regarding the construct, after Exploratory Factor Analysis procedures.

## Data analysis procedures

In the database construction, we used Excel for Windows' statistical package, double-entered, followed by database checking and unification. We transferred the file to IMB-SPSS, version 22, for statistical analysis. We performed Exploratory Factor Analysis (EFA), a multivariate inferential method indicated to find the underlying structure of a data matrix, through latent factors that represent a set of variables<sup>(19,21)</sup>.

We conducted a factor analysis of the 33 Ludic-quest variables in two stages, respecting the significant differences between the gameplay/learning groups (17 variables) and emotions (16 variables). We aim to extract valid factors and items for each of these dimensions of playfulness, in order to identify latent conceptions. We start from the following conceptual bases: a - gameplay/learning: mechanical devices of the game that produce interactive immersion, challenges and aesthetic seduction on players, enhancers of reflections on learning; b - imaginative emotions: affective sensations provoked by the game in participants, with ambiguities between pleasure, fun, estrangement and tension<sup>(7,14,18,22)</sup>.

To verify the assumptions for EFA, we used the following methods to observe the matrix adequacy for factoring: the Kaiser-Meyer-Olkin criterion (KMO, value above 0.7) and the Bertlett test (p=0.005). Factor retention was defined from the eigenvalue (Kaiser-Guttman) and eigenvalue > 1. Factor rotation by the Varimax orthogonal method was indicated for variable reduction. To calculate the sample, we assumed the rule of 6 questionnaires per item. The factor loading above 0.6 was considered adequate for variable retention. However, the literature recommends loads with values above 0.5 or a minimum above 0.3, which allowed us flexibility. After each dimension's EFA, we unified the validated items from Ludic-quest. We analyzed the instrument's reliability by Cronbach's alpha, with a parameter of 0.6, indicated for exploratory research<sup>(17,19,21)</sup>.

## RESULTS

In the gameplay/learning EFA, the KMO index was 0.859, with a Bertlett test of p=0.000. The eigenvalue theory (Kaiser-Guttman) indicated four factors to the extraction, with the eigenvalues: F1:4.664; F2:1.424; F3:1.351; F4:1.109 (50.28% of explained variance). From thematic analysis of retained variables, we named the factors, namely: F1 - Reflections; F2 - Immersion; F3 - Challenges; F4 - Aesthetics. Nine variables above 0.6 and one above 0.4 were included (Table 1).

**Table 1** – Factor analysis of gameplay as an expression of the playfulness of games that thematize violence in the health area, according to factors and items, Brasilia, Federal District, Brazil, September, 2021

Gameplay/Learning <sup>a</sup>	Reflection	Challenge	Immersion	Aesthetics	h <sup>2</sup>
I learned amazing things from the game	0.697				0.523
After this match, my interest in the content increased	0.694				0.608
During the match, I reflected on the challenges we face in life	0.683				0.612
The game favored my learning	0.681				0.611
I had difficulty concentrating on the text of the cards		-0.718			0.545
The difficulty of the cards compromised my learning		-0.702			0.535
I actively interacted with my teammates during the game <sup>b</sup>		0.478			0.367
I did not pay attention to what was happening around me while playing			0.645		0.444
I felt more in the game environment than in the real world			0.630		0.596
The game design caught my attention				0.778	0.621
Cronbach's alpha <sup>c</sup>	0.725	0.546	0.321	---	---

a- The table shows only variables with factor loadings above 0.6 retained in the factors. KMO 0.859; p=0.000. Percentage of variance explained by the model 50.28%. Varimax rotation. h<sup>2</sup>=Commonalities.  
 b- Variable with factor loading below 0.60, included in the model in line with the gameplay heuristics and with the minimum acceptable factor loading<sup>(21)</sup>.  
 c- Cronbach's alpha of all variables retained in the model: 0.502.

**Table 2** – Factor analysis of imaginative emotions as an expression of the playfulness of games that thematize violence in the health area, according to factors and items, Brasilia, Federal District, Brazil, August, 2021

Emotions in the game <sup>d</sup>	Pleasure	Tension	Ostranenie <sup>e</sup>	Fun	h <sup>2</sup>
I had fun playing the game	0.792				0.690
I liked the game	0.749				0.597
The game kept me motivated to continue in the game	0.721				0.661
I was fulfilled with the achievements in the game	0.689				0.521
The game made me tense		0.823			0.748
The game made me anxious		0.741			0.620
I felt a mixture of relaxation and tension in the game		0.623			0.452
The challenges of the game discouraged me in the match			0.652		0.588
I felt incapable for not knowing how to answer the questions			0.663		0.442
I was relaxed during the match				0.776	0.499
Cronbach's alpha <sup>f</sup>	0.614	0.638	0.349	----	----

d- The table shows only variables with factor loadings above 0.6 retained in the factors. KMO 0.817; p=0.000. Variance explained by the model 53.31%. Varimax rotation. h<sup>2</sup>=Commonalities.  
 e- Ostranenie (translations): singularization, estrangement, defamiliarization. f- Cronbach's alpha of all variables retained in the model: 0.614.

**Table 3** – Ludic-quest instrument to assess the playfulness of games that thematize violence in the health area, with valid and reliable items, September, Brasilia, Federal District, Brazil, 2021

Items validated for construct	Cronbach's alpha
I learned amazing things from the game	0.716
After this match, my interest in the content increased	
During the match, I reflected on the challenges we face in life	
The game favored my learning	
I had difficulty concentrating on the text of the cards	
The difficulty of the cards compromised my learning	
I actively interacted with my teammates during the match	
I did not pay attention to what was happening around me while playing	
I felt more in the game environment than in the real world	
The game design caught my attention	
I had fun playing the game	
I liked the game	
The game kept me motivated to continue in the game	
I was fulfilled with the achievements in the game	
The game made me tense	
The game made me anxious	
I felt a mixture of relaxation and tension in the game	
The challenges of the game discouraged me in the match	
I felt incapable for not knowing how to answer the questions	
I was relaxed during the match	

In imaginative emotions in matches, factor analysis showed a KMO test of 0.817 and Bartlett p=0.000. The eigenvalue (Kaiser-Guttman) predicted four factors, with the eigenvalues: F1: 4.400; F2: 1.858; F3: 1.184; F4: 1.089 (53.3% of explained variance). In the analysis of the 10 items included in the factors, we named: F1: Pleasure; F2: Ostranenie (defamiliarization, estrangement); F3: Tension; F4: Fun (Table 2).

Finally, the twenty variables distributed in the eight factors (reflection, challenge, immersion, aesthetics, pleasure, tension,

ostranenie, fun) of playfulness showed good internal reliability, with Cronbach's alpha of 0.716 (Table 3).

## DISCUSSION

The Ludic-quest, in the assessment of the playfulness of games that thematize violence in the health area, fills a gap in the construction of valid and reliable instruments in population studies,

given the identified scarcity<sup>(1-8)</sup>. Regardless of typology (whether digital or non-digital) or trend adopted when creating a game, the results identify factors underlying a phenomenon that is difficult to measure, the playful, placing it at the center of the epistemic field. The inversion in the way of producing research on games with social approaches to health, with an emphasis on gameplay and the game's emotions, innovates, by problematizing the playful's imaginative richness, sometimes subsumed in serious causal outcomes<sup>(10-16)</sup>.

The specifics of the sample and the game type deserve comment. The fact that the respondents are predominantly women, young people and health undergraduate students emphasizes gender as an aspect to demarcate. In this sense, given the historical discrimination that women suffer - not only in the community of players (men, whites, heterosexuals), but also in the restricted space of design - the repercussions of this violence need greater visibility, especially in the unequal opportunities of access to the game. In the case of *Violetas*, gender issues compromise the girls' familiarity and learning with modern-style board games. In addition to being not widespread in Brazil's playful culture, strategy games require a certain amount of time to grasp the gameplay, which implies greater contact with the public, hegemonically dominated by boys. Another point to be highlighted concerns the carrying out of the research with a single game - *Violetas* - and the specificity of confronting violence against women, which compromises the generalization of the results. Identifying a theme with the female bias of the sample favored participants' compliance with the game and playfulness, requiring other investigative approaches. Therefore, in advance, we suggest future research with population segments and with games of different social approaches - from sociodemographic and gender markers - in order to produce new validity and reliability to Ludic-quest<sup>(18,23-24)</sup>.

In the validation techniques, the variables contained in the gameplay/learning and in the emotions were adequate to EFA, with a good KMO Test and a significant Bartlett. The eigenvalue was relevant to the extraction of factors in each dimension, with latent conceptions that denote the self-reference of playfulness, according to the literature. In gameplay/learning, the factors reflections, challenges, immersion and aesthetics are playful characteristics to be forged. Among the emotions that the game mobilizes in a game, the diffuse sensations of pleasure, tension, *ostranenie* (defamiliarization, estrangement) and fun stand out<sup>(7-8,14,22,25)</sup>.

In scientific reviews, there is no consensus on which factors to use in assessing a game, although similar approaches exist<sup>(7-8)</sup>. Learning - whether that learned in a game or referring to external content - is a widely accepted factor in the assessment of a game. In Ludic-quest, we call reflection the factor of perceived learning, for better expressing the meaning of critical-imaginative education. We see that this reflection is expressed more or less intensely, respectively, in the following variables: I learned amazing things from the game; I reflected on the challenges; my interest in the content has increased; the game favored my learning.

Surprise with the new, with astonishment, with the unforeseen and with uncertainty are characteristics of education arising from the playful, in the link with the aesthetic. In other words, at the moment when we are taken to what was not there before, in this ephemeral, necessary for critical formation, the unexplorable thinking of poetic

fruition inhabits<sup>(26)</sup>. In a way, the variables that show admiration for the unusual indicate satisfaction in reflection (I learned surprising things in the game; I reflected on the challenges). On the other hand, those that indicate the game's contribution to the apprehension of themes correspond to the disciplinary aspects of learning (the game favored my learning; my interest in the content increased)<sup>(3,5,7)</sup>. Therefore, reflection factor indicate the educational tendencies in a game, whether inherent or outside the playful field.

The immersion and challenges factors are intrinsic to the game mechanics, in the creation of the playful dynamics. In immersion, the feeling of being in another place, the loss of time, the opening of other senses, time reinvented or inaugurated in a fictional world give centrality to the playful. Likewise, the immersion of participants is permeated by challenges that make up and are awakened by the game itself, in its relational and emotional sense. Alongside this fictional reality, in Ludic-quest, immersion can be measured by variables: I did not pay attention to what was happening around me while playing; I felt more in the game environment than in the real world<sup>(8-14,22,25)</sup>.

Contrary to what it may seem, difficulty is a prioritized component of gameplay. Research proposes a typology for the challenges in a game, namely: a - mechanical difficulties (impact on players' performance and skills); b - interpretive difficulties (barriers to comprehensibility); c - affective difficulties (ambiguous and insoluble emotions aroused). In this agonizing arena, in Ludic-quest, the obstacles of a game can be verified by the items: the difficulty of the cards compromised my learning; I had difficulty in the text of the cards; I actively interacted during the match. Since interaction is an inherent challenge to gameplay, we included this variable in the factorial model, in line with the literature<sup>(22,25,27)</sup>.

Although the dimensions of gameplay and emotions experienced in the match form statistically distinct groups, we argue for the inseparability of play. Whatever mechanics are formally constructed to invent a game, it only happens when activated by players' emotions in that short space temporally delimited by freely accepted rules. For the classic definition of the design area, the game is nothing more than an artificially generated interaction, as it only happens when its regulatory system is agreed among players<sup>(25)</sup>. That said, despite the division of variables into different dimensions in EFA procedures, we assume that they all indicate the same construct, the playful, now described in the underlying aspects.

In the factors latent to the emotions experienced in the match, the playful's indissociability and fugacity stand out, expressed by the ambiguity of the variables. Thus, in the sensations experienced by players on the playful field, the game intertwining with art subsists. As indicative of this flirtation, in Ludic-quest, aesthetics and fun factors - one in each dimension - retained a single variable, escaping the rule of commonalities shared with others, in the same factor<sup>(21)</sup>. Apparently, aesthetic seduction and fruition in a game refuse the common, recognition or any causal nexus, although they are intertwined in the evidence. In other words, subtly, sometimes these variables mix affective performances (aesthetic sensation, in which there is playability; fun, in synesthetic emotion), sometimes they are singularized in free fictional game<sup>(22,25-28)</sup>.

The game's poetic forms have long been discussed by classics, which remind us<sup>(13)</sup>: i - poetry originates in ritual, entertainment

and art, therefore, in the invention of riddles, guesswork and competition; ii - poetry originates in play; iii - poetic language is essentially a play with words; iv - the ritual is performed with singing, dancing and playing; v - music, theater and dance are recreational forms; vi - both play and art are outside practical life, necessity, utility, duty, or truth. In today's virtual world, the dialogue between art and the game also forms the basis of video games' sophisticated aesthetics. Despite the reifying risk of technology on imaginative thinking, we dialogue with these productions, with the exception of safeguarding the game's autonomy<sup>(15-16)</sup>. We also have reservations about the light appropriation of literary criticism, present in some researches. In the reinterpretation of Russian formalism or the theory of aesthetic effect, for instance, aspects such as the limits of meaning of language are improperly incorporated<sup>(14,28-29)</sup>.

Returning to the sensations of playfulness, we know that the difficulty arouses tense desires of conquest in a game, in frank stimulating dispute. To spice up the emotions in a match, interactive defamiliarization production - based on the literary conception of *ostranenie* - makes up a technique to complicate the game and slow down participants' acquisition of skills. In dialogue with Russian formalism, the so-called poetic gameplay in video game production uses artistic language to generate astonishment with the unexpected, with the other made strange, with the exasperating. After all, we know that the work of art's sensations emerge from the unexpected novelty, not from usual. The use of these artifices to make the playful universe incomprehensible intends to provoke in players reflections on the game's formal aspects (its mechanics, language, design, aesthetics, fictionality, rhythm), generating affective discomforts. Such purposeful handlings encourage the participant to dive into the autonomy of the playful, perhaps in their emotional encounter with art, without external references to the fictional world<sup>(14,29-30)</sup>.

In Ludic-quest, the affections provoked by *ostranenie* designate one of the factors extracted in the dimension emotions in the match. We kept the original term, an accidental neologism of the Russian language, for two reasons: i - in line with the recommendation of literary criticism, due to the difficulties in translation; ii - to suggest emotions of estrangement in the reader, self-referring to its meaning. Furthermore, the rescue of negativity proposed here claims that reflective thinking rejects the immediate, with demands for an interpretive effort on the user, although not always pleasant<sup>(30)</sup>. In this strange and persuasive playful environment, the other factors and variables that assess emotions in a game express similar lability, manifesting in sensations of pleasure. (I had fun playing the match; I liked the game; I was motivated; I was fulfilled in the achievements), tension (I was tense; anxious; I felt a mixture of relaxation and tension), next to *ostranenie* (the challenges discouraged me; I found me unable)<sup>(14,22,27-29)</sup>.

In Cronbach's alpha values, the twenty Ludic-quest variables showed good internal reliability. In the factors, reliability is

maintained for reflections, pleasure, tension and also for the variables of emotions in the match.

### Study limitations

Cronbach's alpha values indicate a certain limitation in the scalar use of Ludic-quest in the assessment of the playfulness of games that thematize violence in the health area, requiring further studies. The predominant female gender in the sample and carrying out the research with a single game also limit the extrapolation of results. The findings in general corroborate the universe of investigations on games, which indicate caution in generalizing<sup>(1-8)</sup>.

### Contributions to nursing

The boldness of this study consists in the inversion of the interdisciplinary way of producing research on games in health and nursing, with an emphasis on gameplay and on the emotions of the game. The innovation of this way of asking is to problematize the imaginative richness of the playful in the scope of measurement instrument production, sometimes subsumed in causal outcomes. In other words, Ludic-quest assesses and subsidizes reflections on the playful in games with complex social themes, such as violence, expanding interpretative perspectives. Consequently, critical-imaginative thinking promotion by health and nursing professionals, inscribed in this epistemic turnaround, favors the axiological prioritization of citizenship within the scope of public policies, especially those dealing with violence against women.

### CONCLUSIONS

In this article, we ask what are the latent factors and the valid items regarding the construct in the assessment of the playfulness of games that thematize violence in the health area. In response, the eight validated factors (reflections, immersion, challenges, aesthetics, pleasure, tension, *ostranenie*, fun) indicate playfulness centrality for game production with social approaches in health, composing a reliable assessment instrument of twenty items for use in research. In turn, the rebellion of some variables to the methods of validating playfulness seems to keep gameplay and emotions on the field so that there can be more play.

### SUPPLEMENTARY MATERIAL

<https://doi.org/10.48331/scielodata.AZMS8G>

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