Article

Validity of the Penn Alcohol Craving Scale (PACS) for the Adolescent Colombian Population

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Abstract

Introduction: Addiction behaviors are primary contributors to mental health issues among adolescents, often utilized as coping mechanisms or emotional regulation tools. This study aimed to establish the content validity of the Penn Alcohol Craving Scale (PACS) for Colombian adolescents, recognized for its representation of the cognitive-emotional aspects of craving.

Methodology: This quantitative research focused on instrument validation. Seven subject matter experts evaluated the scale in terms of pertinence, relevance, usefulness, sufficiency, clarity, and appearance. Data analysis was conducted using SPSS version 22, calculating internal consistency and the Content Validity Index. Qualitative feedback from experts was compiled in an Excel matrix, facilitating grammatical and semantic adjustments to the instrument.

Results: Cronbach's Alpha values for each item and the scale exceeded 0.8. Content Validity Index scores exceeded 0.7 in four out of five evaluated criteria. These results supported retaining all scale items in the Colombian version.

Conclusions: The content validation process yielded an instrument that satisfied expert opinion regarding conceptual constructs and explanatory power for the Colombian adolescent population.

Keywords

underage drinking; adolescent; validation study; mental health; craving (DeCS, BIREME)

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Introduction

Adolescence, defined by the World Health Organization as the stage between 10 and 19 years, marks a pivotal period between childhood and adulthood characterized by significant changes in emotional, social, physical, and cognitive domains [1]. This phase renders adolescents particularly susceptible to various challenges and risk factors, including alcohol consumption, which can precipitate adverse health and behavioral outcomes without adequate preventive and control measures [2].

Addictions behaviors stand out as major contributors to mental health issues among adolescents, often serving as coping mechanisms or means of emotional regulation [3]. Studies indicate an elevated risk of addiction in this demographic, with substance use often integrated into socialization and peer acceptance dynamics [4,5].

Globally, alcohol represents a primary risk factor for mortality in the 15 to 19 age group [6]. In Colombia, studies by Pérez *et al*. [7], reveal an alarming trend with the onset of alcohol consumption reported as 12 years, predominantly centered around beer. Furthermore, 31% of adolescents report experiences of intoxication, 46% alcohol consumption in parental presence, and 62% attendance at parties where minors have access to alcohol.

Craving, characterized by a subjective sensation of desire or compulsion to consume substances, emerges as a critical phenomenon influenced by biological, cognitive, or emotional factors [8]. Its management poses a considerable challenge among adolescents, often escalating into disorders that require multidisciplinary intervention [9]. Therefore, efforts are directed towards delaying substance initiation and providing timely interventions for those grappling with substance abuse [10].

In research endeavors across health, social sciences, and humanities disciplines, the validation of instruments is imperative [11] to ensure the reliability of results, thereby

facilitating informed decision-making. The Penn Alcohol Craving Scale (PACS) stands as a notable Instrument due to its succinct questionnaire design, effectively capturing the cognitive-emotional dimensions of craving, thus providing valuable clinical contexts [12].

The PACS scale is a self-administered Likert-type instrument comprising five items, aimed at gathering information regarding the frequency, intensity, and duration of thoughts associated with alcoholic beverages. It also evaluates the individual's ability to resist the temptation to drink and the intensity of desire to consume alcohol during the week preceding the administration of the scale. Results interpretation is categorized as follows: 0–5 (low *craving* intensity), 6–10 (moderate intensity), and >10 (high intensity) [12].

Validation of an instrument questions its appropriateness "for what" or "in function of what", focusing not on the instrument itself, but on validating the inferences drawn from its specific application [13,14]. Content validity specifically addresses whether the included items genuinely represent all dimensions of the phenomenon, evaluating the suitability of questionnaire results for the target population and the behaviors reflected in the construct [15,16]. Despite demonstrating excellent internal consistency and predictive validity for alcohol relapse across various linguistic contexts and populations, the PACS lacks validation instrument for use with the Colombian adolescent population within Colombian territory [12,17,18].

Thus, the objective of this study is to establish the content validity of the Penn Alcohol Craving Scale (PACS) for the Colombian adolescent population.

Materials and Methods

Study Design

This research study employed a methodological approach focusing on instrument validation, specifically utilizing the expert judgment method. This method aims to assess whether a research instrument effectively captures its intended elements prior to its application. Additionally, it seeks to ensure that interpretations concerning the studied phenomenon consider its reality, context, and social as well as ethical implications [19,20].

Sample

This study comprised a panel of seven experts in the field, meeting the recommended criteria of a minimum of seven and a maximum of thirty for content validation, as outlined in the literature [21]. Experts were selected through direct invitation, with contact established via email upon fulfilling the inclusion criteria.

Inclusion Criteria

Experts were selected based on the following inclusion criteria:

•**Expertise and experience in the field**: Specifically in the assessment of patients with substance use disorders, psychometrics, or the application of instruments measuring latent traits.

•**Minimum level of specialization**: Experts were required to hold at least one specialization relevant to the field of study.

•**Professional experience of at least two years**: A minimum of two years of professional experience in the relevant field was necessary.

•**Willingness to participate**: Experts were expected to express interest and willingness to contribute to the study.

•**Availability of time**: Experts were required to have sufficient time availability to thoroughly review the proposed instrument.

•**Three years of experience in the field**: Experts were mandated to have a minimum of three years of experience in the related field.

These criteria ensured the selection of experts with appropriate academic and professional backgrounds, equipped to provide informed evaluations of the proposed instrument.

Techniques and Instruments

Content validation was conducted using an assessment guide comprising the items of the Penn Alcohol Craving Scale (PACS). This guide facilitated expert evaluation of each item based on criteria such as relevance, significance, utility, sufficiency, clarity, and appearance.

Table 1. Characterization of Participating Experts.

Institutional Affiliation	Highest Academic Level	Area of Expertise	Years of Experience
Universidad Pontificia Bolivariana, Medellín	Doctor in Public Health	Public Health, Mental Health, Drug Consumption, Epidemiology	22
Universidad Nacional, Bogotá	Doctor in Nursing	Behavioral Variables, Toxicological and Health Aspects Related to Substance Use	5
Universidad Nacional, Bogotá	Doctor in Public Health	Research, Toxicology, Pharmacology, Addictions	12
Universidad de Caldas	Master in Neuropsychology, Master of Clinical Psychology and Family, Specialist in Rehabilitation of Children and Adolescents	Medical Sciences and Health, Clinical Medicine, Psychiatry	12
Universidad Pontificia Bolivariana, Bucaramanga	Master in Neurosciences	Neuropsychology, Alterations in Basic Psychological Processes Related to Chronic Substance Use	11
Universidad Nacional, Bogotá	Doctor in Medicine, Specialist in Psychiatry, Specialist in Fellows in Substance Abuse, Master of Clinical Psychology and Family Therapy	Psychiatry, Addictions, Comorbidities, Comprehensive Rehabilitation	37
Universidad Colegio Mayor de Cundinamarca	Medical Doctor, Specialist in Psychiatry, Specialist in Social Management	Mental Health, Psychiatry, Psychiatric Epidemiology, Population Studies	35

Source: Compiled by authors.

Table 2. Cronbach's Alpha.

Ítem	Cronbach's Alpha
1	0.89
2	0.81
3	0.821
4	0.956
5	0.874
PACS scale	0.975

Source: Compiled by authors. PACS, Penn Alcohol Craving Scale.

Procedure

The content validation process was guided by expert judgment, constituted a pivotal phase in the construction and initial validation of scales within public health and related domains. The process encompassed several key stages including:

- Objective delimitation

- Expert selection criteria

- Indicator specification

- Finalization of the evaluation template

- Agreement calculation among experts

In this manner, framed within the aforementioned steps, the following procedure was specified:

1. Compilation of a National Directory of Experts: A national directory was compiled, encompassing information about experts in relevant fields such as medicine, psychiatry, psychology, neuropsychology, or clinical psychology. Profiles were analyzed based on the Curriculum Vitae of Latin America and the Caribbean (CvLAC), with consideration given to academic backgrounds.

2. Contact with Selected Experts: Formal invitations to participate in the instrument evaluation process were extended to selected experts via email.

3. Validation Process: For experts who responded affirmatively, the validation process commenced using the predesigned guide, following the signing of informed consent.

4. Compilation of Expert Feedback: Feedback received from experts was consolidated in an analysis matrix,

Table 3. Content Validity Index.

Ítems	Pertinence	Relevance	Utility	Sufficiency	Clarity and Appearance	TOTAL
Item1	0.85	1	1	1	0.57	0.85
Item2	0.85	1	1	1	0.57	0.85
Item3	0.85	0.85	0.85	0.85	0.85	0.85
Item4	0.85	0.85	0.85	0.85	0.71	0.85
Item5	0.85	0.85	0.85	0.85	1	0.85
Total Scale Average	0.85	0.91	0.91	0.91	0.74	0.86

Source: Compiled by authors.

Table 4. Qualitative observations suggested by experts.

Ítem	Observations	Experts Who Suggested the Change
During the last week, how often have you thought about drinking or how good it would make you feel to have a drink?	- The question could be rephrased as follows to be clearer and more concise: How often have you thought about drinking or how good a drink with alcohol would make you feel? - The term "drink or take" can be confusing; clarification is necessary. - "Take something? Or take an alcoholic drink?"	4
In the most intense moment, how was your desire to drink in the last week?	- The wording of the question is confusing and could be improved. - Suggestion: In the past week, at its most intense, how strong was your desire to consume an alcoholic drink? - Given the question's focus on intensity and the response options, it should be reformulated accordingly. At its most intense, how strong was your desire to "drink" in the past week?	3
In the last week, how much time have you been thinking about drinking or how good it would feel if you did?	- Specify the term "beber" as in the first question. - Consider using the word "alcohol" to avoid ambiguity, as "beber" may not exclusively denote alcohol consumption in the Colombian context, potentially leading to biased results.	2
During the past week, how difficult would it be for you not to drink if you knew you had a bottle at home?	- Contrary verb tenses are mixed (last week = past… it would be = future) . - Proposal: How difficult would it be for you not to drink if you knew that she had a bottle of alcohol at home? - In the previous ones it came with "the last week". Additionally, the first part of the question is in the past tense (during the past week) and the rest of the question is in the future. It would be: to what extent was it difficult…	5
Considering your answers to the previous questions, indicate the intensity of your desire to drink over the last week.	- Clarify that this question seeks a general response to avoid confusion with previous items.	2

Source: Compiled by authors.

Table 5. Adapted version of the Penn Alcohol Craving Scale (PACS) for the Colombian adolescent population.

Original scale		Validated scale	
Item #1	During the last week, how often have you thought about drinking or how good it would feel to drink something?	Item #1	During the last week, how often have you thought about drinking alcohol or how good it would be for you to have an alcoholic drink?
Item #2	In the most intense moment, how was your desire to drink in the last week?	Item #2	At the most intense moment of your desire to have an alcoholic beverage in the last week, how strong was the desire?
Item #3	In the last week, how much time have you been thinking about drinking or how good it would feel if you did?	Item #3	In the last week, how much time have you thought about having an alcoholic drink or how good it would feel if you did?
Item #4	During the past week, how difficult would it be for you not to drink if you knew you had a bottle at home?	Item #4	In the last week, how difficult would it be for you not to drink if you knew you had a bottle of alcohol at home?
Item #5	Considering your answers to the previous questions, indicate the intensity of your desire to drink over the last week.	Item #5	Considering your answers to the previous questions, in general, indicate the intensity of your desire to drink alcoholic beverages over the last week.
		Item #6	In the last week, has your desire to drink alcoholic beverages increased while being with friends?
		Item #7	When faced with high-risk situations of drinking alcoholic beverages, what do you think would be your first reaction?

Source: Compiled by authors.

encompassing both qualitative and quantitative aspects assessed by the experts, serving as input for information analysis.

Information Analysis Plan

The instrument validation was conducted as follows:

1. Quantitative Analysis Using SPSS: Quantitative analysis of results was conducted using SPSS version 22 (IBM Corp., Armonk, NY, USA). Additionally, an Excel analysis matrix containing qualitative information was utilized.

2. Qualitative Analysis: Qualitative analysis involved examining general observations provided by the experts. In the quantitative component, internal consistency, and the Content Validity Index (CVI) were calculated. The CVI mathematically evaluated the most appropriate items that should be retained in the validated version of the instrument.

3. Internal Consistency Analysis (Cronbach's Alpha): Cronbach's Alpha was computed for each instrument item and for the overall scale. Interpretation followed ranges outlined by Ruiz Bolívar [22]:

- 0.81–1.00: Very high.
- 0.61–0.80: High.
- 0.41–0.60: Moderate.
- 0.21–0.40: Low.
- 0.01–0.20: Very low.

4. Content Validity Index (I-CVI) Calculation: The I-CVI was calculated by tallying the number of experts rating each item criterion with a score above 3, divided by the total number of experts. An I-CVI above 0.78 was deemed acceptable based on literature [23]. Content validity of the scale was computed by averaging for each parameter and then across all parameters. This involved summing the I-CVI values and dividing by the number of items.

Results

The content validation process engaged seven field experts who meticulously evaluated each item within the original version of the Penn Alcohol Craving Scale (PACS) employing both qualitative and quantitative criteria to tailor it for the Colombian adolescent population.

Table 1 showcases the academic profile of the participating experts, demonstrating alignment with the established inclusion criteria. Notably, 71.42% of the experts were associated with public Higher Education Institutions (HEIs). In terms of educational attainment, 43% possessed doctoral degrees, another 43% held master's degrees, while the remaining 14% were specialists.

Concerning expertise and years of experience, data collected from participants highlighted prominent areas such as psychiatry, mental health, psychoactive substance use, toxicology, and addictions. Furthermore, participants boasted experience ranging from 5 to 37 years, underscoring the relevance of selecting experts grounded in the construct evaluated by the validated scale.

To gauge internal consistency, Cronbach's Alpha was computed for each item in the instrument and for the entire PACS scale, as summarized in Table 2. Notably, all items in the instrument yielded a "very high" coefficient value according to the criteria established by Ruiz Bolívar [22]. Similarly, the PACS scale garnered the same result, affirming a high level of internal consistency conducive to the instrument's application among the Colombian adolescent population.

In the calculation of the Content Validity Index (I-CVI), which assessed the level of agreement among experts to identify items suitable for retention in the final version of the instrument based on the evaluated construct, it was observed that the average for each evaluated criterion, both for individual items and the scale as a whole, surpassed 0.7. This surpassing threshold indicates adequacy for inclusion in the final version of the validated instrument, affirming its essential nature (see Table 3).

It is notable that while the I-CVI results justifies retaining all items, lower ratings were observed for the clarity and appearance criteria. Consequently, a qualitative analysis of the scale was conducted based on expert insights, leading to suggested semantic changes and new items to achieve the complete adaptation of the instrument. Key observations are outlined below (see Table 4).

With additional insights from experts calling for the inclusion of new items to comprehensively assess the Craving phenomenon, various observations were noted:

- "The current questions are appropriate and cover essential points for a comprehensive evaluation. While considering an additional question concerning physical symptoms (such as anxiety, stress, headache) could be beneficial, maintaining brevity and simplicity enhances instrument adoption and patient response. General observations should focus on improving question clarity."

- "Given the adolescent study population, it would be advantageous to incorporate an item querying whether the desire to drink intensifies in the presence of peers (friends)."

- "The introduction mentions that the instrument 'addresses aspects related to the frequency, intensity, and duration of thoughts associated with alcoholic beverages, as well as the subject's ability to resist the temptation to drink.' However, there is no question pertaining to the duration of thoughts."

Based on this feedback and subsequent deliberations and analysis by the research group, a validated scale suitable for use among the Colombian adolescent population was consolidated. Table 5 presents the adapted version of the Penn Alcohol Craving Scale (PACS) alongside a comparison with the original scale.

Discussion

The evaluation by experts confirms the content validity of the Penn Alcohol Craving Scale (PACS) for the Colombian adolescent population.

In the methodological framework and as a critical step toward developing a robust instrument, it is crucial to design tools that incorporate the most relevant criteria before subjecting them to expert scrutiny. This approach, consistent with suggestions by authors such as Juárez and Tobón [24], was meticulously followed in this study.

To establish quality criteria for assessing the content of the instrument, we conducted an analysis and selected criteria proposed by various authors. These criteria encompassed categories such as relevance, appropriateness, coherence, utility, sufficiency, clarity, significance, and appearance [25–27].

The expert selection process, guided by Juárez and Tobón's [24] criteria, emphasized the importance of experts' experience relevant to the evaluated construct. The outcomes of this process facilitated decisions regarding item preservation, restructuring, or elimination from the scale, in line with the study's findings.

Regarding the instrument's reliability, the Cronbach's Alpha coefficient for the total scale was 0.975, demonstrating strong internal consistency. This aligns with findings from the original version of the ACQ-SF-R by Singleton [28] (1995) (alpha range between 0.77 and 0.86) and the

Spanish translation by Gálvez *et al.* [12] (2016) (α = 0.87) and closer to the reported value for the Brazilian version by Girelli *et al.* [29] (2019) (α = 0.91). It is important to note that this coefficient is recommended for instruments that have between 3 and 20 items [30].

The calculation of the Content Validity Index emerged as a rigorous process affirming the suitability of the instrument for specific populations, driven by expert assessment [31]. Results showed the index's appropriateness for individual questions and the scale as a whole, underscoring the role of statistical processes in enhancing instrument quality for research processes [32].

The application of validated and adapted instruments equips therapists with pertinent tools to identify warning signs and symptoms accurately, thereby facilitating diagnostic and therapeutic processes [33]. Furthermore, adjustments made to the validated instrument for Colombian adolescents ensure scientifically endorsed results aligned with contextual realities [34].

Based on expert evaluations, adjustments were made to question wording to enhance precision for the study population. Additionally, experts suggested two new items that complement the assessment of alcohol consumption in adolescents. This aligns with Ventura-León's [33] assertion regarding the validation process's capacity to develop new items consistent with theoretical postulates. This assertion is supported by the results of the study conducted by Mayo, Guzmán, and Saldarriaga [35], who reported that the addition of new items increases the instrument's relevance and makes it pertinent for specific populations. Some studies conducted in the health field have emphasized the importance of using validated instruments adapted to specific contexts. These instruments play a crucial role in ensuring that measurement results contribute effectively to tailored programs and policies designed to address the needs of the populations being studied [36].

Conclusions

The content validation process has yielded an instrument that, according to the experts, satisfies conceptual constructs and elucidates the studied phenomenon. The results of this study provide the academic and scientific community with a content-validated scale tailored to address issues such as alcohol consumption in the adolescent population. This opens possibilities for research projects, the outcomes of which can inform decision-making and strengthen programs aimed at preventing consumption and adverting relapses.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Author Contributions

OMC, CVA designed the research study. OMC and CVA performed the research. CVA and NSP analyzed the data. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The research adhered strictly to the ethical principles delineated by the Declaration of Helsinki of the World Medical Association and the guidelines stipulated in Colombian Resolution for health research 008430, Article 1125. This study fell under the category of "research without risk" as it involved analysis of characteristics without impacting participants' behavior or employing ethically contentious measures. All collected information was used for research purposes, upholding principles of integrity and privacy. In every instance, explicit informed consent was obtained from participants.

In executing the research, experts engaged in the digital completion and signing of informed consent documents. These documents provided comprehensive details regarding the study, ensuring participants were fully informed, while also guaranteeing the confidentiality of their information.

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Conflict of Interest

The authors declare no conflict of interest.

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