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PRESENTATION, ANALYSIS AND VALIDATION OF A RESEARCH INSTRUMENT TO SURVEY THE HABITS OF USE OF DERMOCOSMETICS

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ABSTRACT

The objective of the present study was to present a reliable instrument for conducting survey-type research on the knowledge, use and habits of the interviewees in relation to dermocosmetics, consultations with dermatologists and the interviewees' concepts about the necessary skin care. To this end, a questionnaire was prepared, approved by the research ethics committee and applied to 199 people, so that the necessary statistical reliability tests could be carried out with the results. The results obtained showed that the questionnaire elaborated can be considered reliable and thus the present study presents this new research tool, as no questionnaire for this purpose was found ready and validated in the recent literature that was researched. It should be noted that it is very important to know people's behaviors, attitudes, opinions and preferences so that you can act consciously in the dermatology market, seeking actions that can improve people's quality of life, prevent diseases and make the population aware of the behaviors that must be modified or maintained in certain situations, because knowing the opinions and behavior of the client is essential in any area of activity.

Keywords: Dermatology. Medicine. Poll Survey.

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INTRODUCTION

Evaluating the reliability of a questionnaire brings relevance to the answers obtained, considering that every measurement is imperfect and will have a certain amount of errors associated, these errors can be both random and systematic errors; There are several methodologies that can be used for the evaluation of research instruments, indicating the percentage of possibility of the existence of such errors, and the questionnaires can be analyzed both question by question; as a whole or even in parts. According to what can be seen from the results of these evaluations, it is possible to find some question that is indicated as a possible focus of reliability reduction, so this analysis can only validate a questionnaire, as well as indicate points of improvement in the instrument that can be modified until its complete validation based on the values of reliability indices (GASPAR; SHIMOYA, 2017 and BIKOS, 2024).

Among the methodologies that can be used to analyze the reliability of questionnaires, we can mention the lambdas, alpha and omega coefficients, developed to perform different types of calculations proposed by different scholars, namely: Guttman (1945); Cronbach (1951) and McDonald, (1999), such indices are widely used and explained in some more recent articles, such as that of Freitas and Rodrigues, (2005); Gaspar and Shimoya (2017), Bikos, (2024) among other authors.

All these coefficients range from 0 to 1, where values closer to 1 represent better reliability, since a value of 0.75 would mean that 75% of the variance in the answers was due to the reality of normal variation among people, while the rest of the variation was due to some error, which in this case would total 25% (NAJERA CATALAN, 2019). According to Bikos (2024), for one-dimensional measurements, values above 0.80 indicate satisfactory reliability, while for multidimensional measurements with well-defined dimensions, values above 0.65 would already be satisfactory, from which it can be concluded that errors between 20 and 35% could be considered acceptable depending on the situation. Superior errors can already be investigated and adjustments to the instrument can be made, if possible, with a view to reducing incorrect answers, which in turn tend to reduce the reliability of the information obtained and instill errors in the conclusions of the studies, based on the answers given.

Another method of assessing reliability, also quite old, is the one described by Callender, John and Osburn (1979), called *Split-Half Reliability*, or cross-validation (COELHO JUNIOR, 2023), such a technique is a statistical methodology used to evaluate

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the internal consistency of a test or measurement instrument. This approach involves dividing a set of items into two halves, allowing researchers to compare the results obtained in each of them. The central idea is that if a test is reliable, the two halves should produce similar results, indicating that the instrument consistently measures what it sets out to measure.

The objective of the present study was the construction, application, after approval by the ethics committee and validation through reliability analysis of the constructed instrument, based on the answers obtained regarding the behavior of young students in relation to dermocosmetics and their analysis through the presentation of the values of reliability coefficients and comparison of the answers given in two groups drawn for cross-validation, with a view to comparing and validating the directions of the answers obtained in these two groups.

METHODOLOGY

For the elaboration of the research, first a questionnaire on the knowledge, customs and use of dermocosmetics was constructed, then the questionnaire was submitted to a pre-test by eight students of the medical course at FAG to adjust the understanding of the questions. Subsequently, the instrument was reviewed by two specialists, one from the area of dermatology and the other from the area of statistics, for the last adjustments, before being submitted to the approval of the research ethics committee of the Assis Gurgacz Faculty – FAG of Cascavel-PR, where the project was approved under number 83135624.7.0000.5219. After approval, the signatures of the participants in the ICF were collected and the answers of 199 interviewees were used to prepare this study, who also delivered the Consent Forms of their parents/guardians, as they were adolescents between 15 and 17 years old, who were the target objects of the study approved by the Ethics Committee. It should be noted that the final questionnaire (Figure 1) is not specific for this age and can be used in research on the use of dermocosmetics in any age group and for any location within Brazil, Portugal and places where Portuguese is spoken, as it is a questionnaire prepared in Portuguese.

The students were approached in two schools, one public and one private, both in the municipality of Cascavel-PR, and the questionnaires were provided printed and answered on paper. Subsequently, the answers obtained were all transformed into numbers, and the answers that were received on a nominal scale were also transferred to

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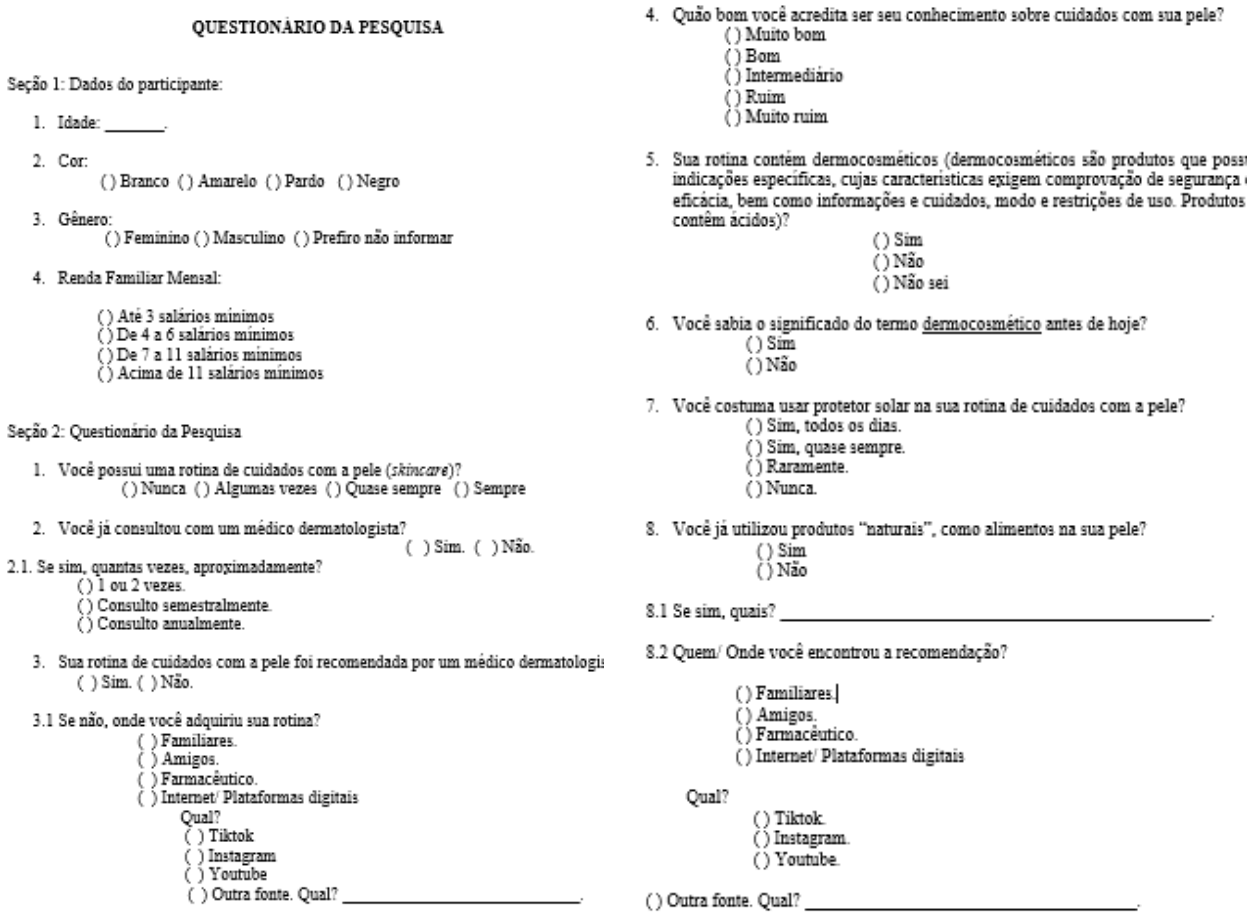
a numerical scale, using integers namely 0,1,2,3 and so on, and typed in a Microsoft Excel® spreadsheet to enable statistical analyses.

Matthiensen (2011) explains that the methodologies that use questionnaires to collect data are widely recognized, in addition to being a practical and economical method that can be applied to the most varied areas of research, and in general the tool can be applied to acquire information about people's behaviors, attitudes, opinions and preferences. However, for the data collected to be relevant, it is important that the instrument used has been evaluated and is really capable of inferring or measuring what is sought in the research. The author explains that reliability analyses should be used to ensure the quality of the questionnaires to be applied.

Figure 1. Image of the questionnaire prepared and applied to the students.



QUESTIONÁRIO DA PESQUISA

Seção 1: Dados do participante:

1. Idade: _____.
2. Cor:
   ( ) Branco ( ) Amarelo ( ) Pardo ( ) Negro
3. Gênero:
   ( ) Feminino ( ) Masculino ( ) Prefiro não informar
4. Renda Familiar Mensal:
   ( ) Até 3 salários mínimos
   ( ) De 4 a 6 salários mínimos
   ( ) De 7 a 11 salários mínimos
   ( ) Acima de 11 salários mínimos

Seção 2: Questionário da Pesquisa

1. Você possui uma rotina de cuidados com a pele (*skincare*)?
   ( ) Nunca ( ) Algumas vezes ( ) Quase sempre ( ) Sempre
2. Você já consultou com um médico dermatologista?
   ( ) Sim. ( ) Não.

2.1. Se sim, quantas vezes, aproximadamente?
   ( ) 1 ou 2 vezes.
   ( ) Consulto semestralmente.
   ( ) Consulto anualmente.

3. Sua rotina de cuidados com a pele foi recomendada por um médico dermatologis
   ( ) Sim. ( ) Não.

3.1 Se não, onde você adquiriu sua rotina?
   ( ) Familiares.
   ( ) Amigos.
   ( ) Farmacêutico.
   ( ) Internet/ Plataformas digitais
   Qual?
   ( ) Tiktok
   ( ) Instagram
   ( ) Youtube
   ( ) Outra fonte. Qual? _____.

4. Quão bom você acredita ser seu conhecimento sobre cuidados com sua pele?
   ( ) Muito bom
   ( ) Bom
   ( ) Intermediário
   ( ) Ruim
   ( ) Muito ruim

5. Sua rotina contém dermocosméticos (dermocosméticos são produtos que poss
   indicações específicas, cujas características exigem comprovação de segurança
   eficácia, bem como informações e cuidados, modo e restrições de uso. Produtos
   contêm ácidos)?
   ( ) Sim
   ( ) Não
   ( ) Não sei

6. Você sabia o significado do termo dermocosmético antes de hoje?
   ( ) Sim
   ( ) Não

7. Você costuma usar protetor solar na sua rotina de cuidados com a pele?
   ( ) Sim, todos os dias.
   ( ) Sim, quase sempre.
   ( ) Raramente.
   ( ) Nunca.

8. Você já utilizou produtos "naturais", como alimentos na sua pele?
   ( ) Sim
   ( ) Não

8.1 Se sim, quais? _____.

8.2 Quem/ Onde você encontrou a recomendação?
   ( ) Familiares.
   ( ) Amigos.
   ( ) Farmacêutico.
   ( ) Internet/ Plataformas digitais

   Qual?
   ( ) Tiktok.
   ( ) Instagram.
   ( ) Youtube.

( ) Outra fonte. Qual? _____.

Source: Authorship (2024).

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In the present studies, all analyses of the reliability coefficients were performed with the aid of the JASP Software (Version 0.19.3), developed in R language and provided free of charge for use by the JASP Team (JASP, 2024).

Another analysis that can be used to evaluate the reliability of questionnaires is the division into two halves (*Split-Half Reliability),* which was also performed in the present study through the use of the answers of the even lines x answers of the odd lines, and in this way 2 groups of answers were obtained that were then compared through Pearson's correlation analysis and through a multiple regression analysis, with the help of the Microsoft Excel® spreadsheet.

RESULTS AND DISCUSSION

Vieira and Bressan (2022), explain that in the academic world, most quantitative research is carried out through questionnaires and that the results of these researches are conditioned to the construction of a good research instrument, if this is taken into account it is much more likely that the scientific value of the results obtained will be high and that the researcher will be able to meet the objectives of the research, even if it is known that a good instrument alone is not able to guarantee the success of a study.

Among the reliability coefficients calculated (Table 1), the highest value found was for Guttman's lambdas. According to Zaiontz (2023), Guttman's reliability is a very good measure of reliability and yields a higher value than Cronbach's alpha, which is the most commonly used measure. While Cronbach's alpha tends to underestimate actual reliability, Guttman's reliability can overestimate reliability when the sample size is small or there are a large number of items. According to Matthiensen (2011), in exploratory research, as is the case of the present study, an alpha above 0.6 can already be considered sufficient.

Table 1. Values resulting from the Reliability Statistical Analyses of the complete dataset and their upper and lower reliability limits.

Estimates	McDonald's ω	Cronbach's α	Guttman's λ2	Guttman's λ6
Calculated value	0.666	0.633	0.690	0.839
Lower Limit 95%	0.210	0.562	0.636	0.825
Upper limit 95%	0.735	0.695	0.739	0.890

The mean of the values found for the 4 coefficients was 0.707, which leads us to realize that, on average, the questionnaires were reliable, because this value can be considered satisfactory for the analysis of questionnaires, because according to Freitas

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and Rodrigues (2005), coefficient values above 0.6 indicate moderate reliability and above 0.75 high reliability, Thus, the values indicated that the questionnaire, when analyzed globally, is reliable and has a moderate to high reliability, depending on the coefficient that is taken into account in its analysis.

When the questions were analyzed individually, only a few had some coefficients indicating worrying values (Table 2), and even these were not indicated as a problem by all the coefficients. Thus, it is believed that the questionnaire and its answers showed that it could be used and validated as a questionnaire that generates reliable answers and that if applied more than once to the same population, it would tend to generate similar results, no question was perceived as incorrect, incomplete or confusing and thus the questionnaire could be applied in the way it is presented in this study (Figure 1).

Table 2. Values resulting from the Statistical Reliability Analysis of each of the questions asked analyzed individually.

Coefficients calculated for each item questioned				
Questions	**McDonald's ω**	**Cronbach's α**	**Guttman's λ2**	**Guttman's λ6**
Gender	0.648	0.609	0.671	0.826
School	0.661	0.624	0.683	0.834
Age	0.676	0.640	0.698	0.844
Colour	0.677	0.644	0.701	0.843
Income	0.660	0.617	0.681	0.833
Routine	0.672	0.632	0.688	0.837
Consultation with a dermatologist	0.652	0.615	0.675	0.826
Consultation times	0.656	0.613	0.673	0.826
Doctor-recommended routine	0.653	0.613	0.672	0.826
Where you bought it	0.374	0.563	0.635	0.802
Tik tok	0.624	0.599	0.659	0.810
Instagram	0.655	0.622	0.681	0.833
You Tube	0.665	0.632	0.689	0.835
Skin knowledge	0.679	0.638	0.695	0.841
Routine with dermocosmetics	0.677	0.660	0.710	0.849
Did you know the meaning of dermocosmetic	0.669	0.633	0.691	0.845
Wear sunscreen	0.680	0.636	0.692	0.838
Natural products	0.648	0.607	0.668	0.818
What products do you use	0.661	0.624	0.683	0.833
Where did you find the recommendation	0.640	0.592	0.662	0.800
Tik tok	0.647	0.609	0.669	0.808
Instagram	0.662	0.629	0.687	0.833

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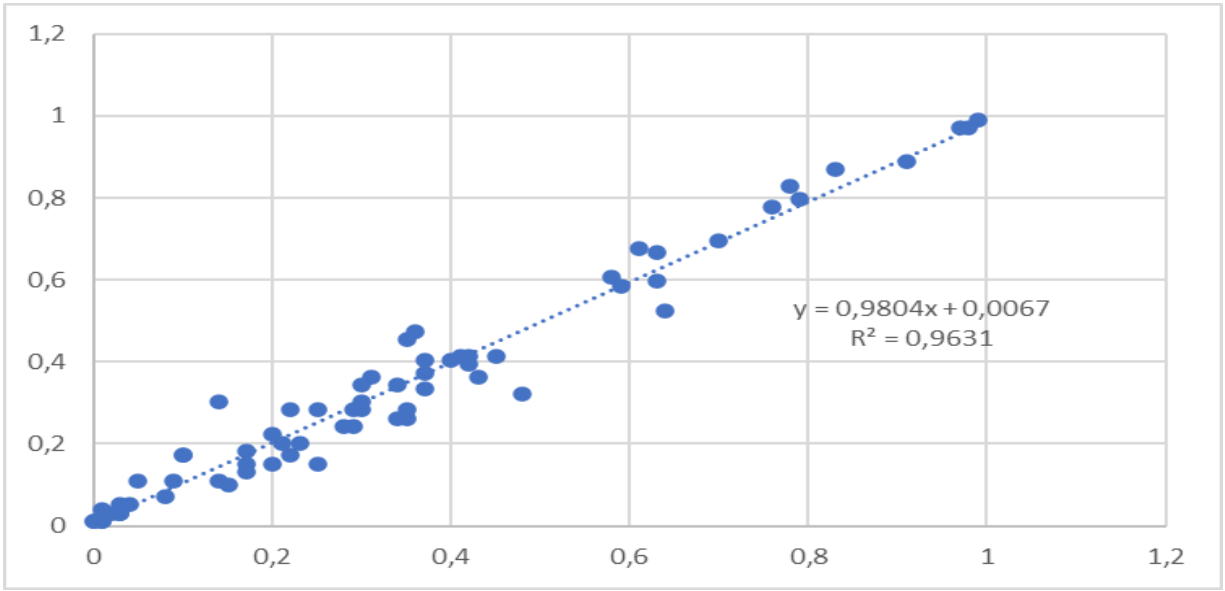
You tube	0.665	0.631	0.688	0.832

Note. Some items are in reverse scale: Gender, Income, Routine, Knowledge of skin, Whether the meaning of dermocosmetics was known, Use of sunscreen and Use of natural products.

The questions with lower values for the coefficients mentioned the questioning of where the interviewees had acquired the skin care routines (3.1 and 8.2) and the questioning referred to information having been obtained from friends, pharmacists, family, doctors or on the internet, considering that not all the coefficients judged this question to be a problem for the reliability of the questionnaire and that the answers to this question are interesting For the ongoing research and the coefficients of the questionnaires as a whole were above 0.6, it was decided to keep the questionnaire unchanged. However, if any modification were to be made, these would be the issues that should be analyzed in search of improvements or even an analysis with the removal of them from the results, to verify the changes in the values of the calculated indexes.

The results obtained through the *split-half reliability* test also indicated that the questionnaire based on its answers can be considered reliable, and the result of the Pearson's correlation coefficient of the data resulted in a value of 0.98 and when a regression was performed between the results of the percentages of the answers between the two groups, the value of the correlation coefficient was 0.96.

Figure 2. Regression analysis between the results of the two halves analyzed, with regression equation and correlation coefficient value.



Source: Authorship based on data from the survey carried out.

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The values indicated by this test were higher than the values found in the calculation of the coefficients, it is important to highlight that this is one of the simplest tests to perform, but only one division was made in half, if another division was made the values found could be different, there are many ways to divide the results and the adoption of different ways causes them to change, However, based on the values found, the reliability of the results obtained in the questionnaires would be considered high to very high, which is slightly above what was found by the values calculated for the coefficients. It should be borne in mind that the coefficients perform a more complete analysis and it is always good to calculate the coefficients and not only the halved method, but the methods can complement each other.

The complete presentation of the results of this study, presenting the information regarding people's behaviors, attitudes, opinions and preferences, which were found after the complete statistical analysis of the data, will be prepared for publication in the future, considering that the amount of information obtained was very extensive and the present study also does not aim to exhaust the analyses and information acquired with the answers of the interviewees, however, in order to support and prove data collection, Table 3 was prepared to present the p-values calculated for the present data collection and the minimum and maximum (estimated) results for future similar research, based on the actual data obtained.

Table 3. Values calculated for p value of all analyses by the binomial test and the lower and upper limits estimated based on the results obtained in the real answers presented in the questionnaires applied to students between 15 and 17 years of age from the two schools (public and private) in the municipality of Cascavel-PR.

Variables	Levels	p value	Lower limit	Upper limit
Gender	Female	0.016	0.516	0.657
	Male	0.016	0.343	0.484
School	Particular	<.001	0.731	0.848
	Public	<.001	0.152	0.269
Age	15	<.001	0.305	0.443
	16	<.001	0.276	0.412
	17	<.001	0.225	0.355
Colour	White	<.001	0.704	0.826
	Yellow	<.001	0.011	0.064
	Brown	<.001	0.126	0.236
	Black	<.001	0.008	0.058

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Income	more than 11	<.001	0.091	0.191
	from 6 to 10	<.001	0.243	0.376
	from 4 to 6	<.001	0.206	0.333
	less than 3	<.001	0.229	0.360
Routine	always	<.001	0.193	0.317
	almost always	<.001	0.157	0.274
	Sometimes	0.007	0.333	0.474
	never	<.001	0.091	0.191
Consulted dermatologist	yes	0.023	0.511	0.652
	No	0.023	0.348	0.489
Consultation times	annually	<.001	0.043	0.121
	semiannually	<.001	0.083	0.180
	1 or 2 x	0.004	0.328	0.469
	never	0.007	0.333	0.474
Routine recommended by doctors	yes	<.001	0.239	0.370
	No	<.001	0.630	0.761
				Continues...
Continuation:				
Variables	**Levels**	**P Value**	**Lower limit**	**Upper limit**
Where he acquired the routine	There's no routine	<.001	0.271	0.407
	Family	<.001	0.148	0.263
	Friends	<.001	0.003	0.043
	Pharmacist	<.001	0.018	0.078
	Internet	0.007	0.333	0.474
	Many locations	<.001	1.272×10-4	0.028
Tik tok	No	0.002	0.542	0.681
	yes	0.002	0.319	0.458
Instagram	No	<.001	0.849	0.938
	yes	<.001	0.062	0.151
You Tube	No	<.001	0.964	0.999
	yes	<.001	0.001	0.036
Skin knowledge	Very good	<.001	0.047	0.127
	Good	<.001	0.206	0.333
	Intermediary	0.065	0.362	0.504
	Bad	<.001	0.126	0.236
	Very bad	<.001	0.021	0.084
Routine with Dermocosmetics	yes	0.023	0.348	0.489
	No	<.001	0.257	0.391
	I don't know	<.001	0.202	0.328
Did you know the meaning of A dermocosmetic	yes	0.011	0.338	0.479
	No	0.011	0.521	0.662

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Wear sunscreen	Yes daily	<.001	0.253	0.386
	Yes almost always	<.001	0.165	0.285
	rarely	<.001	0.239	0.370
	never	<.001	0.113	0.219
Natural products	yes	<.001	0.286	0.422
	No	<.001	0.578	0.714
What products do you use	Not mentioned	<.001	0.792	0.896
	Quoted	<.001	0.104	0.208
Where did you find the recommendation	Never used	<.001	0.572	0.710
	Family	<.001	0.083	0.180
	Pharmacist	<.001	0.001	0.036
	Internet	<.001	0.161	0.280
	Many locations	<.001	1.272×10-4	0.028
Tik tok	No	<.001	0.742	0.857
	yes	<.001	0.143	0.258
Instagram	No	<.001	0.936	0.989
	yes	<.001	0.011	0.064
You tube	No	<.001	0.942	0.992
	yes	<.001	0.008	0.058

Source: Authorship based on statistical analysis and survey data.
Note. Ratios tested against the value of 0.5.

Practically all the p-values calculated using the binomial test were small (< 0.05), which means that there is a small probability that the difference observed between the groups is random, even though we did not seek to obtain more responses from women than from men or from students who study in private schools than in public schools or directed to people of a certain color or social level. This occurred, from which it can be stated that in some cases the indication of the p values, the existence of a statistical difference between the number of people who answered the questionnaire, and there was no intentional direction, probably indicates that there are more people with these characteristics in the target population of the present study.

In some situations, the indication of statistical difference may be even more interesting, considering the existence of statistical differences between the groups of people who consult and who do not consult dermatologists, number of times they consult, application of skin care routine, place where they acquired these routines, among other questions that presented p values lower than 0.05 and indicated that these behaviors of this portion of the population It was not due to chance and that there was a significant difference in behavior between certain groups of the interviewed population.

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Finally, based on these values obtained and presented, a lot of interesting information can be acquired, which in future statistical analyses of the data, which are intended to be carried out, built and published in new *papers*, it will certainly be possible to better understand what may have led people to have different behaviors in relation to skin care, influencing factors and behavioral differences.

CONCLUSION

Finally, it was noted that the questionnaire and its results can be considered reliable, and by the values calculated for the alpha, lambda and omega coefficients, the reliability would be considered between moderate and high and by the division in half between high and very high.

Thus, it is concluded that the questionnaire does not require any alteration and can be validated as a reliable and interesting tool for the evaluation of the behavior of young people in relation to skin care and their behaviors in relation to the use of dermocosmetics, thus filling a gap in this area of research, in view of the difficulty of finding instruments in recent literature that are intended for this purpose and that have if proven reliable to use.

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