STUDIA ECOLOGIAE ET BIOETHICAE

Man's Attitude Towards Nature and Animal Respect Questionnaire (AniRe-Que)

Kwestionariusz stosunku człowieka do przyrody i szacunku dla zwierząt (AniRe-Que)

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Abstract: The psycometric properties (validity and reliability) of the author´s original tool named *Questionnaire of the Relations between a Man and Animals* (further on *AniRe-Que*) was constructed to assess the relations between a man and animals as natural beings; calculated in the form of an R-score (R as respect). The questionnaire is based on the theoretical outcomes of an egalitarian zoocentric, ecoethical position attributing moral statues to all beings, and measures the level of respect expression to nonhuman beings. The aim of this study was to verify its validity and reliability in a research sample of future primary and secondary teachers ($N = 500$, 62% of females, M_{age}=22.3; SD=4.1) at Matej Bel University in Banská Bystrica, Slovakia. Various statistical procedures were used to verify its construct validity (exploratory factor analysis /EFA/) and its convergent/discriminating character, criterion validity, and reliability (test-retest, parallel-forms, internal consistency) to establish satisfactory psychometric properties for the *AniRe-Que* questionnaire. The questionnaire has possible usage for the animal relation estimation by researchers, practitioners and teachers´ ethical and environmental education intervention effectiviteness, and also as a form of future international cooperation and verification based on this new instrument.

Keywords: man and animal relation, animal respect questionnaire (AniRe-Que), psychometric properties (validity, reliability)

Streszczenie: Własności psychometryczne autorskiego narzędzia o nazwie *Kwestionariusz relacji człowieka do zwierząt* (dalej *AniRe-Que*) zostały skonstruowane do oceny relacji między człowiekiem a zwierzętami jako istotami żywymi; obliczany w formie wskaźnika R (R jak respekt). Kwestionariusz opiera się na teoretycznych wynikach egalitarnego zoocentrycznego stanowiska ekoetycznego przypisującego moralny status wszystkim istotom i mierzy poziom szacunku w stosunku do istot pozaludzkich. Celem tego opracowania jest weryfikacja trafności i rzetelności kwestionariusza na próbie badawczej przyszłych nauczycieli szkół podstawowych i średnich (N = 500, 62% kobiet, M_{age} = 22,3; SD = 4,1) na Uniwersytecie Mateja Bela w Banskiej Bystricy na Słowacji. Zastosowano różne procedury statystyczne, aby zweryfikować trafność jego konstrukcji (eksploracyjna analiza czynnikowa /EFA/) oraz jej zbieżny/dyskryminacyjny charakter, trafność kryterialną i rzetelność (powtórzenie testu, formy równoległe, spójność wewnętrzna) w celu ustalenia zadowalających właściwości psychometrycznych kwestionariusza *AniRe-Que*. Kwestionariusz może być wykorzystany do oceny stosunku do zwierząt przez teoretyków, praktyków i nauczycieli w zakresie skuteczności interwencji na polu edukacji etycznej i środowiskowej, a także jako forma przyszłej międzynarodowej współpracy i weryfikacji w oparciu o ten nowy instrument.

Słowa kluczowe: relacja człowiek-zwierzę, kwestionariusz szacunku dla zwierząt (AniRe-Que), właściwości psychometryczne (trafność, rzetelność)

Introduction

Norms regulate human behavior helping to orientate various meanings and to articulate a person's own worldwide paradigm. One question is what position nature or animals have expressing a certain metaphysical hierarchy not being completely conscious, though a man acts according to it unconsciously. Revelations about human relations with animals take an interdisciplinary approach drawing from research in philosophy, neuroscience, psychology, law, history, sociology, economics, and anthropology (Kasperbauer 2018).

Currently there are tools that assess the attitude towards nature (Thomson and Barton 1994; Siegrist 1996; Dunlap and Van Liere 1978; Milfont and Duckitt 2010; Krajhanzl 2014), though there are just a few assessing the attitude towards the animals. Research results measuring respondents´ attitudes towards nature only indirectly and marginally suggest attitudes towards animals. We presuppose the attitude towards animals is not identical to the attitude to nature, and we wanted to test this presumption. Kasperbauer (2018) argues provocatively that behind our positive and negative attitudes to animals is an enduring concern that animals pose a threat to our humanness. Namely, our need to ensure animals' inferiority to human beings affects both our kindness and cruelty to animals. Kasperbauer (2018) develops this idea by looking at research on the phenomenon of dehumanization, revealing that our attitudes to other humans are predicted and reflected in our treatment of other species. The experience of natural beauty, realizing its fragility and deterioration, or the number of visits to natural environments do not have to be related to perception of animals in it, and do not have to bear witness of the attitude to them. Nature can be only a certain type of "coulisse" for the activities of man´s self-realization that has nothing in common with animals. Humans might relate to animals, however as instrumental objects in the anthropocentric conceptualization.

1. The questionnaire research background

Our three-year research ambition was to create a diagnostic questionnaire to identify human attitude to animals to be used to measure the efficacy of target-aimed interventions in environmental and ethical education. As Gfeller (2019) mentions the relations between humans and animals are changing echoing the "rupture of balance" mentioned in the definition of crisis in meat production, though the precise studies analyzing these relations are lacking. This study presents the verification process of its primary psychometric properties (validity and reliability).

The questionnaire was theoretically anchored in zoocentric egalitarian eco-ethical theory based on an American philosopher, Tom Regan (1983). There are no research tools to assess man´s zoocentric attitude to animals as natural entities in the environmental and ecological research. The zoocentric egalitarian eco-ethical attitude to animals fundamentals rest on the respect to life, eventually on the human effort not to hurt any feeling beings. Besides the acceptance of the implicit value of the animal life (Schweitzer 1974; Taylor 1986), there is our eco-ethical starting point to understand animals as "subjects of life" (Regan 1983). In Regan´s conception, all the life subjects have an equal (inherent) inner value. Zoocentric egalitarian attitudes to the animal kingdom do not create a hierarchy, though they emphasize a "position of rights". Immoral behavior is then manifested by acts devoid of respect, consideration, or deference to a holder of this kind of inner vale of life subjects.

Respect to someone is understood as an acknowledgement of dignity and autonomy of the concerned being, its appreciation and appraisal. Respect is the opposite of controlling and is not identified with a feeling of inferiority. Respectful treatment diverges from any manipulation, which would imply treating others as means or tools to reach our own goals. Respect to the life of others starts with an *amazement* at

life as it is a source of meaning and value and also an aim. The most general biocentric approach assumes that every individual organism is a teleological center of life leading up to its own good (Schweitzer 1974; Taylor 1986). The good for living beings is everything that keeps them alive, develops their potential, and enables prosperity. This means that a holder of life has an *inherent value* being considered as a goal by itself, and man is asked to express respect to its holders. Traditional Ethics look for respect of borders in a human life and human relation sphere, though the ethics of respect to life teaches to respect every form of life, teaches compassion with every life, and presupposes the life secret is as great for man, and its value is not appreaciated enough by man.

The zoocentric egalitarian position is a sub-type of bio-centric concept (considering only animals, not all the living creatures) and it belongs in the highest respect that manifestations to non-human beings among the current eco-centric concepts. This concept is expressed with a maxima of a raw score from our Animal Respect Questionnaire (further on AniRe-Que).

Research aim and research questions
This study presents the research analysis of the AniRe-Que psychometric properties verification formulated in two main research questions:

RQ1: Is the AniRe-Que as an unidimensional construct tool valid in the sense of construct (based on the size of the relationship between constructs) and criterion (based on the size of the difference between certain groups) validity?

RQ2: Is the AniRe-Que as an unidimensional construct tool reliable in the sense of test-retest and internal consistency reliability?

2. Research Method
2.1. Pilot study of a research instrument

The first version of the questionnaire created for the pilot study verification was the AniRe-Que (40). During its formation process, one of the establishing aims was to assess all various areas of animal and human connections by means of three main attitude components – cognitive, affective and behavioral. The questionnaire thematize animals in a general sense (as "animals"), however at the same time in a concrete one – for example; animal usage for economic purposes in the entertainment or sport industry, in the pharmacy, textile or food processing industry; animals domestic and also wild. Regarding eco-ethical theory, there were no statements analyzing the motive of a relation quality to animals as the aim was to concentrate only at a man´s attitude to animals emphasizing the one-dimensionality of the questionnaire.

The questionnaire AniRe (40) consisted of 40 statements. On the basis of exploratory factor analysis, of internal consistency analysis, and of inter-item correlation analysis, the final version of AniRe-Que (15) was explored and its psychometric properties are analyzed below.

The AniRe-Que(15) contains 15 items that identify man´s attitude to animals emphasizing respect toward them. To assess the degree of dis/agreement of judgmental attitudes, Likert's 5-point scale is used. There are three reversed items in it to reduce respondents´ stereotype responses. The global score labeled R-score (R for respect), and has a range with a maximum value of 5 and minimum of 1.

2.2. Research sample

The sample, based on available and intentional sampling procedure (with an aim to get more male respondents), consisted of 504 university students (62% of women, M_{age}=22.3; SD=4.1) of various humanistic and educational study fields from three faculties of Matej Bel University in Banska Bystrica, Slovakia (N=285 /57.8%/ from Faculty of Education,; N=120 /24.3%/ from Faculty of Arts, N=88 /17.9%/ from Faculty of Natural Sciences). Five hundred questionnaires were completed properly representing only 1% of its mortality loss.

The test-retest analysis was based on 93 questionnaires.

The criterion validity of the instrument was assessed using the online sampling of the organizations[1] aimed at animal rights protection (animal defenders) declaring the animal respects as a motif for their protection, being at the same time manifested by their eating-habits (all of them were vegetarians and vegans, and the main reason was animal protection /other reasons, e.g, healthy, religious, or ecological were eliminated/). There were 145 respondents (76% of women, M_{age}=23.2; SD=6.2).

Research procedure

To characterize the normal distribution of the analyzed data set, measures of symmetry, skewness, and kurtosis were used.

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1 We have contacted animal welfare organizations (and at the same time asked them to distribute the questionnaire to other Slovak animal welfare organizations – snowball effect sampling): Slovenská aliancia ochrancov zvierat (http://saoz.sk), Sloboda zvierat (www.slobodazvierat.sk), Združenie za práva zvierat (https://zzpz.sk), Martinská iniciatíva (www.changenet.sk/?section=kampane&x=721912), OZ Vegánske hody (www.veganskehody.sk), Góvinda (www.govinda.sk), Slovenská vegánska spoločnosť (http://veganskaspolocnost.sk), Živica (www.zivica.sk), Združenie za práva zvierat (https://sk-sk.facebook.com/ZZPZSK/), OZ Združenie ochrancov a priateľov zvierat (https://sk-sk.facebook.com/ZOPZ-Združenie-ochrancov-a-priateľov-zvierat-284721856277/).

Our values were in the range of .0≤skewness≤.064 and .0≤kurtosis≤.230. The histogram illustrating skewness and kurtosis of data set normal distribution is presented in Figure 1. This enabled the use of parametric statistical analysis to verify validity and reliability of AniRe-Que (15).

3. Research Results Description and Analysis

3.1. Research question 1

RQ1: What is the AniRe-Que(15) validity? The AniRe-Que(15) validity was verified by:
A) exploratory factor analysis (EFA);
B) construct validity – comparison to a similar known and established instrument (convergent and discriminant validity);
C) criterion validity – comparison to a known group.

The construct validity of an instrument is considered together with other researchers (Hendl 2009; Urbánek et al. 2011) as the most important and significant validity proof enabling to operationalize the construct itself.

A) Construct validity – exploratory factor analysis (EFA)

As it has been already mentioned, the AniRe(40) preceded the AniRe-Que(15). The AniRe(40) as a new scale created a foundation for identifying a set of latent constructs underlying a battery of measured variables. There was no a priori hypothesis
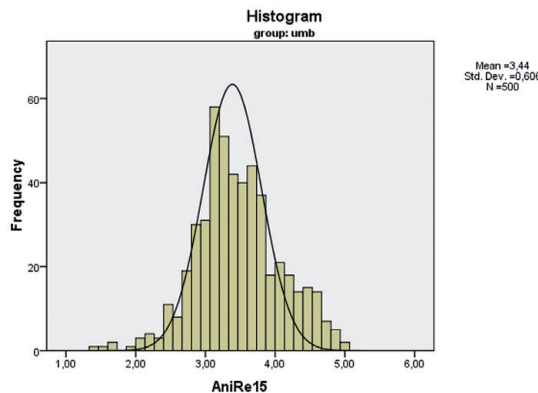
Figure 1. Data Set Normal Distribution

about factors or patterns of measured variables. The multivariate statistics were used to uncover the underlying structure of a relatively large set of variables with the aim to identify the underlying relationships between the measured variables. This analysis helped to identify more general characteristics explaining the variable interrelations. These characteristics identified by factor analysis are marked as factors or dimensions. It was analyzed by EFA with an aim to find out its own factor structure. First, we analyzed Kaiser-Meyer-Olkin index (KMO) explaining the degree of availability to realize factor analysis. In our situation, KMO reached a value of .887; which is an acceptable result in a scientific community (it is recommended KMO to reach a value of KMO ≥ .50). Barlett´s sphericity test indicates how the observed correlation matrix diverges significantly from the identity matrix (<.001). The EFA was used as a result of the content item analysis presupposing some of the items might load onto unknown factors being explored by the correlation matrix. Some unexpected inter-item relations were identified. The EFA used a method of dimension reduction technique with a method of Direct Oblim, as it was expected a non-orthogonal (oblique) solution, in which the factors are allowed to be correlated. We realized this would result in higher eigenvalues but diminished interpretability of the factors. The aim was to minimize a variable number correlating highly with individual factors or dimensions to reach simpler factor structure. The first EFA extracted 11 latent factors explaining 57.35% of its variability. Subsequent item elimination not reaching acceptable factor loading (≤.60), and following rotation formed 15-item final version of AniRe-Que(15) explaining 57.32% of construct variance. Factor item loads for AniRe-Que(15) are presented in Table 1.

Referring to Kaiser´s criterion to state the optimal number of factors leaving the factors with eigenvalue above 1.00, and considering the scree plot, there were identified 4 factors

Table 1. AniRe-Que(15) EFA results of factor matrix

	AniRe-Que(15) items	Components			
		1	2	3	4
7	While walking, I pay attention to the ground to avoid smashing an ant, a bug, or a rain-worm.	.63			
9	If I witnessed suffering of farm animals, I would reduce meat eating.	.72			
8	I want to eat meat-free food not to take animals' life by my eating habits.	.74			
10	I do not kill flies or spiders, I rather take them out of my room.	.62			
11	I do mind horse-racing.	.66			
12	I do not kill intentionally mice or gnawers, I rather put them into a cage, and carry them out of my place.	.64			
4	A lot of animals are smart/intelligent.		.60		
5	Besides other people, also animals are our "fellowmen".		.78		
6	Primates (or apes) have a lot of characteristics similar to people.		.74		
15	A lot of animals experience similar feelings/emotions to people.		.70		
13	Pills for people need to be tested on animals to be more effective and safer. (R)			–.85	
14	Cosmetics need to be tested on animals to be safer for people. (R)			-.82	
1	Watching animals in their natural surroundings enriches me internally.				.75
2	I like watching documentaries about animals´ lives.				.73
3	I get bored when I observe animals. (R)				-.81
	% variance	28.9	11.4	9.1	7.1
	Cronbach´s alpha	.77	.69	.77	.69

by a research sample of 500 university students. This 4-factor solution explains 57.32% of construct variability considered as an acceptable value. The factor loadings were also calculated for each item only when their loading was above .60 and saturated only one factor. The items with the highest factor loadings for each factor, named as markers, are the most relevant for that concrete factor interpretation. Each factor consisted of 2 to 6 items from AniRe-Que(15).

The first factor consisted of 6 items explained 28.9% of the overall variability. This factor emphasizes the behavioral component of the attitude and considers *everyday respect to animal life*. The second factor, consisted of 4 items, stresses the cognitive component of the attitude, and explains 11.4% of the overall variability referring to *judgment of the "closeness" or "similarity" between men and animals*. The third factor consisting of two items aiming at behavioral attitude component explains 9.1% and expresses *the animal usage for a man´s profit and benefit*. The fourth factor (explaining 7.1% of the overall variability) aims at the affective attitude component and expresses *man´s experiences while meeting animals.*

Considering the fact the third and the fourth factor consist of a very small number of items, it has been decided to consider the AniRe-Que(15) as a unidimensional tool assessing the respect of a man to animals based on the founding ecoethical theory.

B) Construct validity (its convergent and discriminant character) – AniRe-Que(15) in relation to another instrument (FEOAU)
The next aim was to verify the construct validity (its convergent and discriminant character) predicting that the correlations of the measure are examined in regard to variables that are known and should be related to the construct. So AniRe-Que(15) construct validity was evaluated in relation to ecocentric, anthropocentric, and apathic attitude of a man to environment by the means of *Questionnaire of Ecocentric and Anthropocentric Attitudes Towards the Environment* (Thompson and Barton 1994) and the modified version of *Fragebogen zur Erfassung der ökozentrischen und anthropozentrischen Umwelteinstellung* (further on FEOAU by Siegrist 1996) was used. FEOAU consists of 27 items assessing the attitude to environment based on three aspects by Likert´s 5-point scale of dis/agreement. The questionnaire assesses the dominant orientation to nature, differentiating among anthropocentric, ecocentric and apathic orientation.

On the basis of the theoretical background, it was expected there would be positive relations between animal respect (from AniRe-Que/15/) and eco-centric attitude (from FEOAU questionnaire) supporting the convergent validity, and almost up to zero (Urbánek, Denglerová and Širuček 2011) or negative (Maršálová and Mikšík 1990) relations supporting discriminant validity between the animal respect and anthropocentric and apathic attitude.

AniRe-Que(15) assesses the animal respect level labeled as R-score (R as respect) reaching values from 1 to 5, and 5 represents the highest level of animal respect. In Table 2, the basic descriptive statistics of R-score from AniRe-Que(15) and three environmental orientation attitudes from FEOAU are presented.

According to the normal distribution characteristics (skewness and kurtosis) can be stated that the analyzed variables are normally distributed. Construct validity of AniRe-Que(15) and its convergent-discriminant character was verified to three environmental attitudes from FEOAU by the means of Pearson correlation analysis presented in Table 3.

It can be stated on the basis of Pearson correlation coefficients that R-score is significantly positively and strongly related to the ecocentric attitude to FEOAU questionnaire supporting the convergent character of the construct validity of AniRE-Que(15). The R-score has a significant

Table 2. Descriptive statistics of R-score from AniRe-Que(15) and three environmental attitudes from FEOAU

AniRe-Que	N=500	Min	Max	M	SD	Median	Skewness	Kurtosis
	R-score	1.40	5.00	3.44	.61	3.40	.064	.218
FEOAU	Ecocentric attitude	1.17	5.00	4.01	.59	4.08	–.711	.988
	Anthropocentric attitude	1.50	5.00	3.38	.64	3.38	–.348	–.001
	Apathic attitude	1.00	4.43	2.22	.67	2.14	.384	–.077

Min – minimum, Max – maximum, M – arithmetic mean, SD – standard deviation

Table 3. Correlation analysis of R-score from AniRe-Que(15) and three environmental attitudes from FEOAU questionnaire

	N=500r	FEOAU questionnaire		
		Ecocentric	Anthropocentric	Apathic
			attitude	
AniRe(15)	R-score	.619***	–.127**	–.408***
FEOAU	Ecocentric		.007	–.476***
	Anthropocentric			.299***

** p ≤ .01   *** p ≤ .001

Table 4. R-score differences between two groups

AniRe-Que(15)		Min	Max	M	SD	Median	Skewness	Kurtosis	t-test	p	d
Students MBU (N=500)	R-score	1.40	5.00	3.44	.61	3.40	.064	.218	–36.71	.000	2.70
Animal rights defenders (N=143)		3.80	5.00	4.69	.24	4.73	-.897	.712			

moderate and negative relation to apathic attitude and significant low and negative relation to the anthropocentric attitude from FEOAU supporting the discriminant character of the AniRe-Que(15) construct validity.

C) Criterion validity

We aimed at AniRe-Que(15) criterion validity by the means of known groups (Maršálová and Mikšík 1990). which was a group of the animal rights defenders (N=145; 76% of females, M_{age}=23.2; SD=6.2). Their animal respect was declared by their eating-habits, for they were vegetarians and vegans because of ethical reasons in respect to animals. It has been presupposed that this group would have reached a significantly higher level of animal respect from AniRe-Que(15) than our basic research sample. Table 4 presents the results of the R-scores differences by a parametric Student's t-test analysis for both samples.

It can be stated that the animal rights defenders research sample reaches a significantly higher level of R-score from AniRe-Que(15) than our experimental research sample. We do realize besides the statistical significance, the practical significance expressed by effect size is also important. Cohen (1988) states statistical significance as a p-value is not a sufficient expression of differences between two independent research samples, because sometimes the

statistically significant difference has a trivial importance from the practical point of view referring to a multiple sample (Sullivan and Feinn 2012). It can be considered in the case of our experiment research sample. Cohen (1988) formulated effect size difference calculated between two research sample means divided by a standard deviation being unrelated to the research sample size. There were stated conventional values enabling to decide whether it is a huge (d≥2.00), or very large (2.00≥d≥1.20; Sawilowsky 2009), or large (d≥.80), medium (.80≥d≥.50) or small (d<.50) effect size (Cohen 1988) referring to practical (or clinical) difference significance (Hendl 2009).

Calculating the effect size difference, we can conclude there is a huge difference in R-score between our experimental research sample of students and animal rights defenders. The criterion validity of AniRe-Que(15) is supported by the means of the so-called known research groups.

3.2. Research question 2

RQ2: What is the AniRe-Que(15) reliability? The AniRe-Que(15) reliability was estimated by three various procedures:
A) by means of its internal consistency;
B) by split-half reliability;
C) by test-retest stability.

A) The AniRe-Que(15) instrument internal consistency

The overall instrument internal consistency for the whole research sample and for the individual genders is presented in Table 5.

The calculated values of alpha coefficients of the whole instrument for the whole sample and for the genders reach acceptable values of internal consistency ($\alpha \geq .67$).

B) The AniRe-Que(15) split-half reliability

Further on, reliability was verified by means of an internal consistency measure, i.e. by split-half method reliability as presented in Table 6.

The AniRe-Que(15) internal consistency estimated by split-half method was realized by correlation between two split halves of an instrument using Guttman´s Split-Half coefficient. It can be stated the values are of an acceptable level for the whole sample and for both genders ($r_{xx} \geq .75$).

C) Test-retest AniRe-Que(15) stability

The third procedure was based on test-retest stability estimation in a time length of six weeks with a test-retest research sample of N=93 students.

The test-retest stability of AniRe-Que(15) estimated by Pearson correlation coefficient reach the level of .80 enabling to state the high level of time stability of this instrument.

Discussion and conclusion

Kasperbauer (2018) also emphasizes a new way of thinking about our moral obligations to animals, and how we must change and correct our attitudes towards them. Our intention was to create an instrument that would enable researchers, practitioners and teachers to detect the general attitude towards animals. Our statistical analysis was based on our own original AniRe-Que(15) psychometric properties verification, especially its validity and reliability (by the means of six various statistical procedures). Reduction of the initial AniRe-Que(40) by the exploratory factor analysis extracted in the form of AniRe-Que(15) enabled the creation of a research instrument for animal respect assessment with acceptable psychometric properties especially construct and criterion validity and internal and stability reliability trying to fill up the gap for human-animal relation assessment. The considered animal respect reflects the ecoethical theory of zoocentric egalitarianism (that attributes a moral status to all beings). However, we recommend assessing only the overall score of the animal respect for the basic two extracted factors explain only lower level of variability (less than 10%) and consist of a low number of items (2-3 items). We present three various forms of reliability estimate (internal consistency by alpha coefficient and split-half

Table 5. AniRe-Que(15) internal consistency reliability

Cronbach´s Alpha	Gender		
	Whole sample (N=500)	Female (N=310)	Male (N=190)
AniRe-Que (15)	α = .82	α = .82	α = .80

Table 6. AniRe-Que(15) reliability by split-half method

	Cronbach´s alpha				Guttman´s Split-Half coefficient
	Part 1		Part 2		
	Nmb.	α	Nmb.	α	
AniRe-Que (15) (N=500)	7	.71	8	.71	.77
AniRe-Que (15) (females /N=310/)	7	.71	8	.71	.78
AniRe-Que (15) (males /N=190/)	7	.70	8	.69	.75

Table 7. AniRe-Que(15) test-retest estimate for the retest research sample

Test-retest reliability	Re-test research sample (N=93)
AniRe-Que(15)	r = .80[***]

coefficients, and test-retest reliability) that indicate acceptable values supporting this questionnaire as a reliable, accurate and precise instrument to assess the animal respect attitude. The validity estimate based on factor analysis, construct validity and its convergent and discriminant character and criterion validity as well prove the Ani-Re-Que(15) comes from the conceptualized theory, and assesses our intention, i.e. the animal respect attitude. This supports the idea that the attitude to nature in general is not covered in its sense with the animal respect attitude.

Relations to animals assessment are rather rare as an object of the study (Gfeller 2019) and we do realize the instrument validity is a continuous process, so that is why we call attention to its administration with other research samples and also in other cultures.

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