

# Development of the Animal Empathy Scale Short-Form

## Hayvanlara Yönelik Empati Ölçeği Kısa Formunun Geliştirilmesi

 Nur Okutan<sup>1</sup>

<sup>1</sup>Van Yüzüncü Yıl University, Van

### ABSTRACT

This study aimed to develop the short form of the Animal Empathy Scale (AES-SF). To this end, the study first conducted the Turkish validity and reliability analyses of the long scale and the selection of the items for the short form. The construct validity of the eight-item short form of the scale was then tested in a separate sample. The construct validity of the scales was examined in the first sample using principal component analysis and in the second sample using confirmatory factor analysis. In both studies, the convergent validity of the scales was tested with related psychological traits. McDonald's omega and item-total test correlation coefficients were used to assess the reliability of the scales. Test-retest reliability was also examined for the short form of the scale. The long form of the scale showed a two-factor structure, as did the original scale. The analyses indicated that the long scale was valid and reliable for Turkish culture. The confirmatory factor analysis results of the AES-SF supported the two-factor structure. Convergent validity analyses showed that the relationships were significant and in the expected direction. The correlation coefficients between the scores on the short and long forms of the scale are also high. Reliability scores also indicated that the short form provided accurate and stable measures. Furthermore, the validity and reliability coefficients of the short and long forms are close. According to these results, the AES-SF can be used as an alternative to the long form of the scale.

**Keywords:** The Animal Empathy Scale, psychometrics, short form

### ÖZ

Bu çalışmada, Hayvanlara Yönelik Empati Ölçeğinin kısa formunu (HYEÖ-KF) geliştirmek amaçlanmıştır. Bu amaçla, çalışmada ilk olarak uzun ölçeğin Türkçe geçerlik ve güvenilirlik analizleri ve kısa form için madde seçimi gerçekleştirilmiştir. Ardından farklı bir örneklemede ölçeğin sekiz maddelik kısa formunun yapısal geçerliği sınanmıştır. Ölçeğin yapı geçerliği, ilk örneklemede temel bileşenler analiziyle, ikinci örneklemede doğrulayıcı faktör analizi ile incelenmiştir. Her iki çalışmada, ölçeklerin yakınsak geçerlikleri, ilişkili psikolojik özelliklerle test edilmiştir. Ölçeklerin güvenilirlikleri, McDonald omega ve madde-toplam test korelasyon katsayılarıyla değerlendirilmiştir. Ölçeğin kısa formu için ayrıca test tekrar test güvenilirlik değerine bakılmıştır. Ölçeğin uzun formu, özgün ölçekteki gibi iki faktörlü bir yapıya işaret etmiştir. Diğer analizler de uzun ölçeğin Türk kültürü için geçerli ve güvenilir bir araç olduğunu göstermiştir. HYEÖ-KF'nin doğrulayıcı faktör analizi sonuçları, iki bileşenli yapıyı desteklemiştir. Yakınsak geçerlik analizleri, beklendiği yönde anlamlı ilişkilere işaret etmiştir. Ek olarak, kısa ve uzun ölçek formu puanları arasındaki bağıntı katsayıları yüksektir. Güvenirlik değerleri de kısa form ile doğru ve kararlı ölçümler yapılabileceğini göstermiştir. Ayrıca, kısa ve uzun formun geçerlik ve güvenilirlikleri yakın değerlerdedir. Bu sonuçlara göre, HYEÖ-KF, ölçeğin uzun formuna seçenek olarak kullanılabilir.

**Anahtar sözcükler:** Hayvanlara Yönelik Empati Ölçeği, psikometri, kısa form

## Introduction

Empathy with animals is central to human-animal interactions (Prato-Previde et al. 2022). Studies have highlighted the role of empathy with animals in the development of positive attitudes (Hills 1993, 1995) and behaviors (Shelton and Rogers 1981), close and secure bonds (Rusu et al. 2019, Bekoff 2020), reduced speciesist beliefs (Gradidge et al. 2022) or harmful behaviors (Figueredo et al. 2022). Empathy with animals is also relevant to people's interactions with others, social groups, and the environment. For example, people with high empathy for animals are less likely to support social hierarchies (Vonk and Weiper 2023), have lower criminal tendencies (Lucia and Killias 2011), and have higher environmental sensitivity (Schultz 2000). These studies provide substantial information, and scientists from different disciplines, such as psychology, ethology, bioethics, and veterinary medicine, are increasingly interested in the subject (Westbury and Neumann 2008, Kasperbauer 2015, Colombo et al. 2016, Young et al. 2018, Bekoff 2020). However, in some related studies, empathy toward animals

**Address for Correspondence:** Nur Okutan, Van Yüzüncü Yıl Üniversitesi, Edebiyat Fakültesi, Psikoloji Bölümü, Van, Türkiye

**E-mail:** nurokutan@yyu.edu.tr

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has been addressed within the framework of human-oriented empathy (Erlanger and Tsytsarev 2012, Schwartz et al. 2012, Signal et al. 2018). This approach reflects the idea that human-oriented empathy includes empathy towards animals and that those who empathize with humans will also empathize with animals (Paul 2000). However, research suggests that animal- and human-oriented empathy are related but distinct traits (Paul 2000, Gómez-Leal et al. 2021). For example, dog owners are more likely to empathize with a puppy, while parents are more likely to empathize with a baby (Angantyr et al. 2011). Similarly, women or veterinarians are more likely to empathize with animals than humans (Angantyr et al. 2011, Norring et al. 2014). Nevertheless, personality traits associated with animal- and human-oriented empathy may also vary. A personality trait that is negative in terms of the quality of interpersonal relationships (narcissistic neuroticism) has been linked positively with animal-oriented empathy but not with human-oriented empathy (Giacomin et al. 2023). In another study, as with human-oriented empathy (de Wied et al. 2012), those with psychopathic traits were expected to have lower empathy for animals than non-psychopaths. However, no difference was found between the two groups regarding empathic responses (de Wied et al. 2021). These examples suggest to researchers that both empathies are associated with different psychological constructs and should be studied as separate traits.

The traits associated with empathy towards animals are diverse, including attitudes and beliefs, individual, socio-cultural, situational characteristics, or personal experiences. The direction of the relationships is positive, with increasing beliefs in human-animal similarities and mental competence of animals (Hills 1995, Rothgerber and Mican 2014), ethical approach to human-animal relationships (being vegan, vegetarian) (Filippi et al. 2010) and gender (being female) (Apostol et al. 2013), but negatively with variables such as cultural norms favoring human-animal distinctions (Prato-Previde et al. 2022), negative experiences with animals (e.g., animal abuse) (Pagani et al. 2007), and level of interpersonal aggression (Figueredo et al. 2022). Although the outlined findings reveal the constructs associated with empathy towards animals, they point to the importance of the topic and suggest that more information is needed (Emauz et al. 2016, Wauthier et al. 2023, Giacomin et al. 2023). Developing appropriate measurement methods and tools is a valid and reliable way to access this information.

Empathy (animal/human) is a measurable trait defined by individual characteristics but can also be determined by situational factors and has behavioral consequences (Jolliffe and Farrington 2004). Researchers have developed various methods and instruments for measuring empathy (animal/human). Among these, self-report and physiological measures are frequently employed. The constructs measured may vary according to the way empathy is conceptualized. Empathy, in simple terms, refers to the ability to understand and share the emotions of others (animal/human) (Mehrabian and Epstein 1972, Cohen and Strayer 1996, Paul 2000, Kasperbauer 2015, Young et al. 2018) and is characterized mainly by cognitive and emotional elements (Hall and Schwartz 2019). Cognitive empathy refers to the ability to perceive and understand another person's situation; emotional empathy refers to the ability to give appropriate emotional responses (Cohen and Strayer 1996). Based on these conceptualizations, some instruments that assess empathy measure empathy with its emotional component (Mehrabian and Epstein 1972), others combine cognitive and emotional elements (Baron-Cohen and Wheelwright 2004) and measure empathy as a single construct, while others measure empathy multidimensionally with its cognitive and emotional components (Davis 1980).

Self-report instruments are commonly used to assess empathy with animals. There are also studies in which physiological measurements are used, although less frequently. In these studies, empathy with animals has been examined with skin conductance-based measurements of (empathic) reactions to the situations of animals depicted in challenging situations (e.g., psychological suffering, injury) (Plous 1993, Westbury and Neumann 2008) and techniques for visualizing changes in areas of the brain related to empathy (Filippi et al. 2010, Franklin et al. 2013). Among self-report measures, adaptation scales are frequently used. Empathic responses to animals depicted in various situations are assessed. In some studies, for example, human-oriented empathy scales such as the Interpersonal Reactivity Index (Davis 1980) and the Multidimensional Emotional Empathy Scale (Caruso and Mayer 1998) were modified for animals (Powell 2010, Norring et al. 2014, Gradidge et al. 2022, Vonk et al. 2022, Vonk et al. 2022, Vonk and Weiper 2023); in others, empathy with animals has been measured by emotions (e.g., sadness) toward animals in positive/negative situations (e.g., sheep in a transport truck or a wild duck swimming with its young in a lake) (Hills 1993, 1995). sadness) (Hills 1993, 1995) or empathic responses (emotions) to situational (experimental) stimuli generated by short stories (Levin et al. 2017) or visual (e.g., photo, video) narratives (Shelton and Rogers 1981, Schultz 2000, Berenguer 2007). In one study, participants were

asked to rate their empathic feelings (such as compassion and pity) towards a cat or a dog presented in a hypothetical story as hurt/injured by someone (Angantyr et al. 2011).

The most frequently used self-report instrument for assessing empathy with animals is the Animal Empathy Scale (AES) (Paul 2000). The scale has been administered in different cultures and languages, such as America, Australia, Scotland, Spain, Italy, Norway, Peru, Portugal, Romania and Chile (Paul 2000, Ellingsen et al. 2010, Rothgerber and Mican, 2014, Colombo et al. 2016, Emauz et al. 2016, Calderón-Amor et al. 2017, La Torre Gómez 2017, Rusu et al. 2019, Camilleri et al. 2020, Gómez-Leal et al. 2021, Cardoso et al. 2022). The items in the scale were created by adapting the Questionnaire Measure of Emotional Empathy (Mehrabian and Epstein 1972) for animals. In this way, a total of 22 items were prepared. Half of the items are related to empathic emotions, and half to non-empathic emotions. The statements aim to measure the degree of emotional reactions (between 1 and 9) to the emotional states of animals (Paul 2000). Studies demonstrate that the unidimensional scale has high-reliability values ranging from .78 (original scale) to .90 (Paul 2000, Ellingsen et al. 2010, Rothgerber and Mican 2014).

Meanwhile, there is growing interest in short forms of psychological measurement instruments (Koğar 2020). Short scales can be administered quickly and practically and have some advantages for both researchers and participants (Smith et al. 2000). These include the fact that short forms are less costly in terms of time and energy (DeVellis 2016), high response rates, their positive contribution to reducing the potential error sources that may arise from participants owing to loss of attention and interest (Karasar 1995, Aydemir and Kaysi 2020), and allowing complex multivariate models and survey studies to be conducted efficiently (Smith et al. 2000). For these reasons, short scales are generally convenient. However, some issues need to be considered when preparing short forms (Smith et al. 2000, DeVellis 2016). It is essential, for instance, to strike a balance between the brevity of the scale and its reliability (DeVellis 2016). Simply put, when reducing the number of items, researchers should consider that a smaller number of items may represent a trait to be measured (Smith et al. 2000); thus, measurement reliability may decrease (DeVellis 2016). Researchers should also test the validity and reliability of the short form with appropriate methods in order to develop an effective and adequate instrument (Smith et al. 2000). Therefore, when selecting items from the long form, they should determine the statements that can best represent the construct in terms of psychometric and content; test whether the short form is similar to the long form construct; whether it shows similar validity and reliability values; and test the relationship between the two forms with appropriate statistical methods (Raes et al. 2011, Kacmar et al. 2014, Herzog et al. 2015, Longo et al. 2018, Koğar 2020).

Given the growing interest in empathy towards animals, especially in the field of health, the short form of the AES may have practical benefits. Currently, there is a 13-item, two-dimensional form of the long scale. Nevertheless, it should be noted that the scale in question was not initially intended for the purpose of creating a short version (Emauz et al., 2016). Hence, the main aim of this work was to create a shortened version of the AES that demonstrates comparable psychometric properties.

## Method

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### Participants

In the study, participants were reached from the general population as in the original scale study, aiming to achieve ease of sampling, and thus, a majority of university students (Postgraduate 9; Van Yüzüncü Yıl University, Türkiye) participated, totaling 433 individuals. Four survey forms considered incomplete and careless were excluded from the study. The sample was divided into two unbiased sections to conduct validity and reliability analyses of both forms. After removing multivariate outliers, the first study included 225 participants (%70.20 female; age:  $M = 22.44$ ,  $SD = 3.65$ , range = 18-41), while the second study included 199 participants (%71.40 female; age:  $M = 22.36$ ,  $SD = 3.52$ , range = 18-42). In the second study, confirmatory factor analysis was only applied to 54 participants, and among them, a test-retest was conducted with 33 individuals (23 females) after a 15-day interval. In both samples, the majority of participants indicated an omnivorous diet ( $N1 = \%92.40$ ,  $N2 = \%93$ ).

## Procedure

After obtaining permission from the owner of the original scale (Paul 2000), the scale was translated into Turkish by two psychologists and an English language expert. Subsequently, the translations were reviewed for consistency and discrepancies, and the final version of the scale was established. The applications were conducted by the researcher with voluntary participants in paper-pencil format, lasting 20-25 minutes each, after receiving approval from the Van Yüzüncü Yıl University Social and Human Sciences Ethics Committee (decision no: 2022/22-07, dated 24.10.2022).

## Data Collection Tools

The research included AES, the Interpersonal Reactivity Index, the Empathic Anger Scale, the Attitude Scale towards Animal Interventions, the Speciesism Scale, and a personal information form were utilized. The AES was introduced in the previous section.

### *Interpersonal Reactivity Index*

Developed by Davis (1980) to evaluate empathy, this scale consists of 28 items organized into four subscales: perspective taking, fantasy, empathic concern, and personal distress, each containing seven items. Rated on a scale of 1 (Does not describe me well) to 5 (Describes me very well), higher scores indicate greater empathy in the corresponding subscale. The Turkish adaptation of the scale was conducted by Engeler (2005) (Cronbach's alpha coefficients for empathic concern = .66; personal distress = .60; perspective taking = .73; fantasy = .76). In the current study, the reliability coefficients (McDonald's omega) for the scales ranged from .60 to .75 in both samples.

### *Empathic Anger Scale*

Developed by Vitaglione and Barnett (2003) to measure empathic anger, this seven-item scale is rated on a scale of 1 (Does not describe me well) to 5 (Describes me very well), where higher scores indicate a higher level of empathic anger. The Turkish adaptation of the scale was conducted by Okutan (2019) (Cronbach's alpha coefficient = .71). In the current study, the reliability coefficient (McDonald's omega) for the scale was calculated as .79 in both samples.

### *Attitude Scale Towards the Treatment of Animals*

Developed by Taylor and Signal (2009) to assess attitudes toward different animal species, this scale comprises three subscales: attitudes toward pets (nine items), harmful animals (six items), and beneficial animals (four items). Items are rated on a scale of 1 (Strongly disagree) to 5 (Strongly agree), with higher scores indicating positive attitudes and behaviors toward animals. The Turkish adaptation of the scale was conducted by Gül and Özay Köse (2019) (Cronbach's alpha coefficients for pets (companion animals) = .84; pests (harmful animals) = .79; profit and utility animals = .65; entire scale = .82). In the current study, the reliability coefficients (McDonald's omega) for the scales ranged from .71 to .93 in both samples.

### *Speciesism Scale*

Developed by Caviola et al. (2019) to assess negative attitudes toward animals, this scale consists of six items rated on a scale of 1 (Strongly disagree) to 7 (Strongly agree), with higher scores indicating a higher level of speciesism. The Turkish reliability analysis of the scale was conducted in this study (McDonald's omega for sample 1 = .79, sample 2 = .66).

### *Personal Information Form*

The form consists of questions about participants' social and economic levels and questions related to pet care and dietary/lifestyle habits.

## Statistical Analysis

The creation of the Short Form of the AES (AES-SF) and the examination of its psychometric properties were conducted in two stages. In the first stage (Sample 1), the Turkish validity and reliability analyses of the long

form were performed, and based on the results obtained, items were selected for the short form. In the subsequent stage (Sample 2), the factor validity of the prepared short form was tested using confirmatory factor analysis; reliability and convergent validity coefficients were examined.

In both applications, first, the suitability of the data set for analysis and the basic assumptions were tested. Initially, missing values were imputed with mean values for both samples; multivariate outliers were removed from the data sets, with three participants from the first and two from the second samples. Normality distributions were examined using skewness ( $< \pm 2$ ) and kurtosis ( $< \pm 3$ ) coefficients as recommended (Kline 2016), and the coefficients were within acceptable ranges for both samples (Eroğlu 2010, Kline 2016). Correlation coefficients did not indicate multicollinearity ( $r > 0.90$ ) or singularity ( $r = 1.00$ ) issues among variable pairs in either data set. Sample sizes met the criterion of being 10-20 times the number of variables (Edwards 1995, Kline 2016) for suitability for factor analysis, as indicated by Kaiser-Meyer-Olkin values ( $N1 = .81$ ;  $N2 = .73$ ) and Bartlett's Test of Sphericity ( $p < .001$ ) for both samples (Carpenter 2018).

Following the fulfillment of assumptions, the structural validity of the long form was assessed using the oblique rotation (oblimin) technique with principal component analysis, considering factors, eigenvalues, explained variance ratios, and factor loadings (Çokluk et al. 2012). The factor structure was also tested using convergent validity analyses and examined for reliability values. Using this information, item selection proceeded. Items were selected based on previous procedures and recommendations (Raes et al. 2011, Herzog et al. 2015, Longo et al. 2018, Koğar 2020); they needed to have high factor loadings in the relevant dimensions, high item-total test correlations, contribute to the reliability of the scale, and demonstrate content validity. Additionally, a balance between negative and positive expressions, like in the original form (11 positive and 11 negative items), was maintained in the short form (Tezbaşaran 1997, Paul 2000). In the short form, this balance was achieved with four positive and four negative statements.

In the subsequent stage, the model-data fit of the eight-item short form was tested using confirmatory factor analysis with the maximum likelihood estimation method. The fit between the model and the data was evaluated using the chi-square/degrees of freedom ratio, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardized Root Mean Square Residual (SRMR), and Root Mean Square Error of Approximation (RMSEA). Acceptable model fit indicators were considered as CFI and TLI values above .90, SRMR and RMSEA values below .08, and a chi-square/degrees of freedom ratio of three or less (Browne and Cudeck 1993). Convergent validity was evaluated in both samples through correlation coefficients between scores from the AES long and short versions, the Interpersonal Reactivity Index subscales, the Empathic Anger Scale, the Speciesism Scale, and the Attitude Scale towards the Treatment of Animals subscales. Correlation and regression coefficients between the long and short-form scale scores were also examined to assess whether the two scale forms measured similar constructs.

The reliability of the scales was calculated using McDonald's Omega ( $\omega$ ) coefficients and item-total test correlation coefficients. The test-retest correlation value was also considered for the reliability of the short scale. The analyses were conducted using the Jamovi 2.3.26 and IBM SPSS 27 statistical programs.

## Results

### Sample 1: Validity and Reliability Findings of the AES- Long Form (AES-LF)

#### *Structural Validity*

Principal component analysis conducted with the oblique rotation (oblimin) method revealed six eigenvalues greater than 1, indicating six underlying factors. However, the model exhibited issues such as some items loading closely on multiple factors, some containing only one or two items, and inconsistency between some items associated with certain factors regarding content coverage. Following recommendations (Carpenter 2018) and for consistency with the original scale structure, the analysis was repeated with a two-factor solution. Results (see Table 1) demonstrate that factor loadings for the two-factor scale range from .37 to .71 for the first factor and from .27 to .65 for the second factor. The factor loading of the sixth item is .27. While this value is below the commonly used threshold value of .32 (Tabachnick and Fidell 2007), the item was retained in the scale due to its potential importance in the scope of the scale. Results also align with the original scale structure, where 11 items are in the empathic feelings factor, and 11 are in the non-empathic feelings factor. The two factors collectively account for 35.60% of the total variance.

**Table 1. Principal component analysis and reliability analysis results of Animal Empathy Scale Long Form (AES-LF)**

| AES-LF Items   | Factor Loadings |          | Item-total score correlations | when item is removed McDonald ω |
|--|-----------------|----------|-------------------------------|---------------------------------|
|  | Factor 1        | Factor 2 |                               |                                 |
| Factor 1: Empathic emotions  |                 |          |                               |                                 |
| <b>7. It makes me sad to see an animal on its own in a cage.</b>                               | .71             | .01      | .61                           | .82                             |
| <b>13. I get very angry when I see animals being ill-treated.</b>                              | .71             | -.09     | .56                           | .83                             |
| 17. I enjoy feeding scraps of food to the birds.   | .69             | -.08     | .56                           | .83                             |
| <b>10. It upsets me when I see helpless old animals.</b>                                       | .68             | -.05     | .56                           | .83                             |
| <b>18. Seeing animals in pain upsets me..</b>  | .66             | .04      | .56                           | .83                             |
| 5. Sad films about animals often leave me with a lump in my throat.                            | .64             | .11      | .60                           | .83                             |
| 9. A friendly purring cat almost always cheers me up..   | .64             | .08      | .57                           | .83                             |
| 15. Pets have a great influence on my moods.   | .57             | .28      | .56                           | .83                             |
| 22. I hate to see birds in cages where there is no room for them to fly about..                | .56             | -.09     | .43                           | .84                             |
| 21. I would always try to help if I saw a dog or puppy that seemed to be lost..                | .52             | .06      | .46                           | .84                             |
| 3. It upsets me to see animals being chased and killed by lions in wildlife programs on TV.    | .37             | -.11     | .25                           | .85                             |
| Factor 2: Non-empathic emotions  |                 |          |                               |                                 |
| <b>16. Sometimes I am amazed how upset people get when an old pet dies. *</b>                  | .10             | .65      | .54                           | .72                             |
| <b>14. It is silly to become too attached to one's pets.. *</b>                                | .05             | .65      | .48                           | .73                             |
| <b>19. People often make too much of the feelings and sensitivities of animals. *</b>          | .15             | .62      | .50                           | .73                             |
| 20. I find it irritating when dogs try to greet me by jumping up and licking me. *             | -.11            | .60      | .40                           | .75                             |
| 11. Dogs sometimes whine and whimper for no real reason. *                                     | -.20            | .60      | .39                           | .75                             |
| 12. Many people are over-affectionate towards their pets.*                                     | -.02            | .58      | .42                           | .74                             |
| 4. I get annoyed by dogs that howl and bark when they are left alone. *                        | .01             | .52      | .42                           | .75                             |
| <b>8. People who cuddle and kiss their pets in public annoy me.. *</b>                         | .13             | .48      | .40                           | .75                             |
| 2. Often cats will meow and pester for food even when they are not really hungry *             | -.04            | .44      | .35                           | .75                             |
| 1. So long as they're warm and well-fed, I don't think zoo animals mind being kept in cages. * | -.07            | .44      | .31                           | .76                             |
| 6. Animals deserve to be told off when they're not behaving properly. *                        | .08             | .27      | .22                           | .76                             |
| Eigenvalue   | 5.16            | 2.68     |                               |                                 |
| Variance explained (%)   | 23.48           | 12.16    |                               |                                 |
| McDonald omega   | .84             | .76      |                               |                                 |

N = 225. Factors were determined by principal component analysis using oblique rotation (oblimin) technique. Bolded statements indicate items selected for the short form; \* indicates reverse-scored items. AES-LF: Animal Empathy Scale Long Form.

**Convergent Validity**

Correlation values between the total score and subscales of AES-LF and the subscales of the Interpersonal Reactivity Index, Empathic Anger Scale, Speciesism Scale, and Attitude Scale towards the Treatment of Animals are provided in Table 2. The analysis results indicate positive correlations between the total score of AES-LF and perspective-taking (r = .40, p < .05), fantasy (r = .24, p < .05), empathic interest (r = .58, p < .05), and empathic anger (r = .49, p < .05) subscale scores; and a negative correlation with the speciesism scale score (r = -.53, p < .05). empathy towards animals is consistent across different animal species. Therefore, an increase in empathy towards animals is associated with supporting positive attitudes and behaviors towards animals classified as "pets" (r = .58, p < .05), "pests" (r = .54, p < .05), and "profit" (r = .39, p < .05). The relationship between the total score of AES-LF and the personal distress dimension of empathy (r = .12, p = .07) is not significant.

### Other Validity Findings

The results also indicate that the subscales of AES-LF are significantly correlated with each other ( $r = .28, p < .05$ ) and with the total score of the scale: factor 1,  $r = .84, p < .05$ ; factor 2,  $r = .76, p < .05$ .

| Variable                   | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10   | 11   | 12   |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|
| 1. AES-LF Total            | —     |       |       |       |       |       |       |       |       |      |      |      |
| 2. AES-LF Factor 1         | .84*  | —     |       |       |       |       |       |       |       |      |      |      |
| 3. AES-LF Factor 2         | .76*  | .28*  | —     |       |       |       |       |       |       |      |      |      |
| 4. IRI, Perspective Taking | .40*  | .37*  | .27*  | —     |       |       |       |       |       |      |      |      |
| 5. IRI-Fantasy             | .24*  | .28*  | .09   | .37*  | —     |       |       |       |       |      |      |      |
| 6. IRI-Empathic Concern    | .58*  | .56*  | .35*  | .49*  | .36*  | —     |       |       |       |      |      |      |
| 7. IRI-Personal Distress   | .12   | .14*  | .04   | .09   | .47*  | .37*  | —     |       |       |      |      |      |
| 8. Empathic Anger Scale    | .49*  | .64*  | .10   | .26*  | .32*  | .44*  | .25*  | —     |       |      |      |      |
| 9. Speciesism Scale        | -.53* | -.40* | -.45* | -.26* | -.16* | -.38* | -.13* | -.29* | —     |      |      |      |
| 10. ASTA-Pet               | .58*  | .62*  | .28*  | .29*  | .22*  | .44*  | .07   | .54*  | -.55* | —    |      |      |
| 11. ASTA-Pest              | .54*  | .51*  | .34*  | .27*  | .11   | .39*  | .00   | .37*  | -.61* | .77* | —    |      |
| 12. ASTA-Profit            | .39*  | .27*  | .36*  | .24*  | .04   | .32*  | .04   | .12*  | -.61* | .35* | .35* | —    |
| M                          | 6.58  | 6.62  | 6.54  | 3.79  | 3.73  | 3.97  | 3.19  | 5.05  | 2.29  | 4.46 | 4.34 | 3.45 |
| SD                         | 1.23  | 1.66  | 1.40  | .70   | .76   | .65   | .72   | 1.13  | 1.18  | .79  | .84  | .91  |

N = 225. AES-LF: Animal Empathy Scale Long Form; IRI: Interpersonal Reactivity Index; ASTA: Attitude Scale towards the Treatment of Animals. ;  $p < .05$

### Reliability

The reliability analysis findings for the scale are summarized in Table 1. Item-total test correlations range from .25 to .61 for the first factor and from .22 to .54 for the second factor. While these values are acceptable for the third and sixth items, they could be considered relatively low (Büyükoztürk 2004). The McDonald's omega coefficient indicates reliable values for the overall scale score (.83) and the subfactors (factor 1 = .84; factor 2 = .76).

### Creation of AES-Short Form (AES-SF)

The short form was created using the results of the factor and reliability analyses of the AES-LF from Sample 1. Accordingly, eight items were selected, four from the relevant factor that loaded highly, had high item-total test correlations, fulfilled the content validity of the scale, and constituted positive expressions (items 7, 10, 13, 18) from the first factor, and four from the second factor that were negative expressions (items 8, 14, 16, 19) (see Table 1). The factor loadings of the selected items range from .66 to .71 for the first factor and from .48 to .65 for the second factor. The correlations of these items with the total score range from .56 to .61 for factor 1 and from .40 to .54 for factor 2 in the order of factor

### Sample 2: Validity and Reliability Findings of AES-Short Form (AES-SF)

#### Structural Validity

The structural validity of the eight-item, two-factor short form was assessed using confirmatory factor analysis. The analysis results are presented in Table 3. The findings indicate the preservation of the two-factor structure of the long-form scale. Accordingly, items 7, 10, 13, and 18 load on the first factor as assumed, and items 8, 14, 16, and 19 are predicted by the second factor (all  $p$  values  $< .001$ ). Standardized item factor loadings range from .41 to .83 for the first dimension and from .51 to .76 for the second dimension. Model-data fit indices suggest an acceptable fit of the proposed short-form structure to the data: chi-square (39.50) / df (19) = 2.07, CFI = .94, TLI = .92, SRMR = .06, RMSEA = .07.

#### Convergent Validity

The convergent validity of the short form was evaluated in relation to the psychological constructs used in Sample 1 (Table 4). Results show that similar to the long form, the AES-SF total score is positively correlated with perspective taking ( $r = .33, p < .05$ ), fantasy ( $r = .20, p < .05$ ), empathic concern ( $r = .34, p < .05$ ), and empathic anger ( $r = .17, p < .05$ ) subscale scores; and negatively correlated with the speciesism scale scores ( $r = -.47, p < .05$ ). Consistent with the long form scale, individuals with higher empathy towards animals also exhibit positive attitudes towards animals classified as "pets" ( $r = .41, p < .05$ ) and "profit" ( $r = .38, p < .05$ ). The

correlations between the AES-SF total score and the personal distress ( $r = -.09, p > .05$ ) and pest animals ( $r = .14, p > .05$ ) subscales are not significant..

**Table 3. Confirmatory factor analysis and reliability analysis results of Animal Empathy Scale Short Form (AES-SF)**

| AES-SF Items   | Factor Loadings |          | Item-total score correlations | when item is removed McDonald $\omega$ |
|--|-----------------|----------|-------------------------------|--|
|  | Factor 1        | Factor 2 |                               |  |
| Factor 1: Empathic emotions  |                 |          |                               |  |
| 13. I get very angry when I see animals being ill-treated..                    | .83             |          | .50                           | .55                                    |
| 18. Seeing animals in pain upsets me.  | .71             |          | .40                           | .62                                    |
| 10. It upsets me when I see helpless old animals .                             | .49             |          | .41                           | .70                                    |
| 7. It makes me sad to see an animal on its own in a cage.                      | .41             |          | .39                           | .73                                    |
| Faktör 2: Non-empathic emotions  |                 |          |                               |  |
| 14. It is silly to become too attached to one's pets. *                        |                 | .76      | .62                           | .64                                    |
| 16. Sometimes I am amazed how upset people get when an old pet dies. *         |                 | .68      | .57                           | .68                                    |
| 19. People often make too much of the feelings and sensitivities of animals. * |                 | .64      | .53                           | .69                                    |
| 8. People who cuddle and kiss their pets in public annoy me. *                 |                 | .51      | .43                           | .74                                    |
| McDonald omega   | .71             | .75      |                               |  |

N = 199; Table shows standardized factor loadings. The correlation coefficients of all items with the relevant factor were significant ( $p < .001$ ). AES-SF: Animal Empathy Scale Short Form; \* denotes reverse-scored items.

**Table 4. Sample 2: Descriptive statistics and correlations of variables**

| Variable                   | 1     | 2     | 3     | 4     | 5    | 6     | 7    | 8    | 9     | 10   | 11   | 12   |
|----------------------------|-------|-------|-------|-------|------|-------|------|------|-------|------|------|------|
| 1. AES-LF Total            | —     |       |       |       |      |       |      |      |       |      |      |      |
| 2. AES-LF Factor 1         | .73*  | —     |       |       |      |       |      |      |       |      |      |      |
| 3. AES-LF Factor 2         | .89*  | .36*  | —     |       |      |       |      |      |       |      |      |      |
| 4. IRI, Perspective Taking | .33*  | .24*  | .29*  | —     |      |       |      |      |       |      |      |      |
| 5. IRI-Fantasy             | .20*  | .16   | .16*  | .26*  | —    |       |      |      |       |      |      |      |
| 6. IRI-Empathic Concern    | .34*  | .28*  | .28*  | .41*  | .36* | —     |      |      |       |      |      |      |
| 7. IRI-Personal Distress   | -.09  | .01   | -.13  | -.10  | .21* | .21*  | —    |      |       |      |      |      |
| 8. Empathic Anger Scale    | .17*  | .12   | .16   | .20*  | .22* | .26*  | .20* | —    |       |      |      |      |
| 9. Speciesism Scale        | -.47* | -.29* | -.44* | -.16* | -.13 | -.26* | .00  | -.07 | —     |      |      |      |
| 10. ASTA-Pet               | .41*  | .28*  | .37*  | .31*  | .19* | .29*  | -.04 | .09  | -.39* | —    |      |      |
| 11. ASTA-Pest              | .14   | .14   | .10   | .18*  | .23* | .30** | .06  | .13  | -.24* | .44* | —    |      |
| 12. ASTA-Profit            | .38*  | .26*  | .34*  | .13   | -.05 | .17*  | .01  | .05  | -.41* | .27  | .09  | —    |
| n                          | 199   | 199   | 199   | 145   | 145  | 145   | 145  | 145  | 145   | 145  | 145  | 145  |
| M                          | 7.98  | 8.25  | 7.70  | 3.90  | 3.67 | 4.09  | 3.24 | 5.48 | 1.94  | 4.77 | 4.61 | 3.41 |
| SD                         | .98   | .92   | 1.42  | .64   | .78  | .58   | .68  | .93  | .86   | .33  | .54  | .92  |

N = 225. AES-LF: Animal Empathy Scale Long Form; IRI: Interpersonal Reactivity Index; ASTA: Attitude Scale towards the Treatment of Animals.

**Other Validity Findings**

The relationships between the subscales of the scale with each other ( $r = .36, p < .05$ ) and with the overall scale score are significant as expected: factor 1,  $r = .73, p < .05$ ; factor 2,  $r = .89, p < .05$ .

The findings, indicating strong and moderately significant relationships between long and short-form scores at both the total scale level ( $r = .81, p < .05$ ) and the subdimensional level, demonstrate the AES-SF's validity as a measuring tool (factor 1:  $r = .54, p < .05$ ; factor 2:  $r = .76, p < .05$ ). Similarly, according to the results of regression analysis, short form scores predict long-form scores,  $R^2 = .66, F(1, 197) = 385.03, p < .05$ .

**Reliability**

The reliability analysis findings for the short form are summarized in Table 3. Item-total test correlations indicate good reliability values. These values range from .39 to .50 for factor 1 and .43 to .62 for factor 2. The McDonald's omega coefficient for the overall short form is .75, for the first factor is .71, and for the second factor is .75. Test-retest correlation coefficients conducted two weeks apart also suggest the stability of the scale's structure: for AES-SF total scores,  $r = .61, p < .05$ ; for factor 1,  $r = .44, p < .05$ ; for factor 2,  $r = .73, p < .05$ .



## Discussion

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Interest in using short scales in research and application fields across various disciplines (such as psychology, psychiatry, and epidemiology) is steadily increasing (Kemper et al. 2019). Researchers emphasize the advantages of shortened instruments to encourage this interest. However, they also underline the need to develop measurement tools that can be as effective as the original scale form (Stanton et al., 2002). The current study meets this expectation. Accordingly, the short-form structure is discovered to be a two-factor structure similar to the long-form. The relationship coefficient between the total scores of the two forms is significant. The associations of the short and long scales with external criterion variables are similar. Furthermore, the scale has good reliability values similar to the original form. The study was conducted in two stages. First, the Turkish validity and reliability findings of the original scale were obtained, and then the psychometric properties of the short form prepared based on these findings were tested.

The analyses regarding the factor validity of the long-form scale indicate support for the two-component original scale structure (Paul 2000) within Turkish culture. The results show that a two-factor structure adequately explains animal empathy, and the item factor loadings, except for the sixth item, are above the generally accepted level for all items (Tabachnick & Fidell 2007). While deciding on this item, its contribution to the scope of the scale was considered, and following an approach adopted in other studies, the item was retained in the scale (Brown & Ryan 2003). The distribution of items across factors (11 positive and 11 negative statements) is also similar to that of the original scale (Paul 2000). Similar results, a two-component structure, were found in another study utilizing exploratory factor analysis (La Torre Gómez 2017). However, based on factor loading values in another study, six items were retained in the first and seven in the second factors, which were named animal empathic concern and emotional detachment (Emauz et al. 2016).

The obtained structure also indicates significant correlational coefficients with external criterion variables. Accordingly, scores calculated from the Interpersonal Reactivity Index subdimensions positively correlate with the AES-LF score, except for the personal distress component. This result aligns with some studies (Cardoso et al. 2022). The lack of a significant relationship for the personal distress component may be explained by the fact that, unlike other dimensions, this empathic concern is self-directed, such as personal discomfort (Eisenberg 1988). Animal empathy is also positively related to human-oriented empathic anger. As theoretically expected (Vitaglione & Barnett 2003), the results demonstrate that individuals who are empathic toward animals (such as feeling angry when animals are treated poorly) have higher levels of anger on behalf of humans in the face of injustices they experience.

Similarly, relationships between long-form scale scores and scores obtained from scales measuring attitudes towards animals are in the expected direction. Consistent with other studies, as empathy towards animals increases, speciesist biases and distinctions related to different animal species (e.g., pets, pest animals) decrease (Caviola et al. 2019, Figueredo et al. 2022, Gradidge et al. 2022). Finally, in line with previous research, the correlation coefficients between subcomponents and their relations with the total score demonstrate that the scale is a structurally valid tool (Emauz et al. 2016, La Torre Gómez 2017).

The reliability analyses of the scale, per previous studies (Ellingsen et al. 2010, Colombo et al. 2016), indicate good internal consistency values (Field, 2009). Item-total score correlations are also positive and of good magnitude ( $\geq .30$ ) for all but two items. According to researchers, items with coefficients between .20 and .30 can be retained in the scale if deemed necessary (Büyükoztürk 2004). Therefore, when interpreting the coefficients of these two items, suggested threshold values and item contents were considered. For example, the third item was retained in the scale as it could represent animals in the wild, and the sixth item was retained as it could represent the behavioral aspect of empathy. Based on the Turkish validity and reliability information of the AES-LF, items were selected for the short form. In selecting items, item statistics (such as factor loading) and content validity of items were considered, as recommended and practiced in previous studies (Tezbaşaran 1997, Raes et al. 2011, Kacmar et al. 2014, Herzog et al. 2015, Tatar 2016, Levant et al. 2013, DeVellis 2016, Krivoshchekov et al. 2021). The factor structure of the determined eight-item scale, identified with these criteria, was tested with confirmatory factor analysis in a separate sample. The findings suggest the preservation of the factor structure of the long-form scale. Accordingly, it can be observed that the items identified in the two-factor scale structure receive high values ( $\geq .40$ ) in their respective factors, and all item loadings are significant (Nunnally, 1978). The fit of the proposed short-form scale model to the data is acceptable (Browne & Cudeck, 1993).

Convergent validity analyses have also demonstrated that the AES-SF is structurally valid. As expected, high scores obtained from the AES-SF are positively correlated with human-oriented empathy structures

(perspective-taking, fantasy, empathic concern, and empathic anger). Likewise, as animal empathy increases, speciesist biases decrease, and positive attitudes towards animals increase regardless of animal species (such as pets or profit/utility animals). However, the coefficients obtained are slightly lower than the convergent validity values of the long form. Additionally, the correlation coefficient between short-form scores and attitudes towards "pest" animal subdimension is insignificant. These differences in convergent validity coefficients could be related to the lower sample size used for the short form of the scale. Further analyses with larger samples could provide clarity on this matter.

The relationships among the scale's subcomponents and its relation to the total score indicate sufficient associations similar to the long-form scale (Tabachnick & Fidell 2007). In the development of the short-form, high correlation coefficients between the two forms and the ability of short-form scores to explain scores calculated from the long forms are also expected indicators of the validity of the scale (Raes et al. 2011, Herzog et al. 2015, Tatar 2016). As anticipated, the coefficients between the total scores of the long and short-form scales and the subcomponent scores are generally strong, with the short-form scale total score accounting for 66% of the long-form scale score.

The reliability analysis results also show that the short form can provide accurate and consistent measurements (Tezbaşaran 1997, Hovardaoğlu 2007). Scale items have a good level of correlation with the relevant dimension total score, indicating consistent integrity of the items. Similarly, the internal consistency coefficients of the scale and the stability between repeated measurements with the same participants (Field 2009) indicate that the AES-SF reliably measures animal empathy. However, the omega reliability coefficients of the short-form scale (total .75, subcomponents .71 to .75) are slightly lower than those of the long-form scale (total .83, subcomponents .84 to .76). Given that the number of items has decreased by one-third, this difference may not represent a significant change in the reliability level of the scale.

The study should be evaluated with its strengths and limitations. Two strengths of the study can be mentioned. First, a short form with high correlation values and similar psychometric properties to the original scale has been developed by following previous procedures. Second, the study introduces the original form of the scale to usage with Turkish validity and reliability information.

The short form can be preferred by researchers, particularly in situations with time constraints, due to its ease of use compared to the long form. Such a preference can also lead to increased participation rates and improved data quality by eliminating potential negative factors (e.g., fatigue) from participants. The short form can also offer practical benefits for clinical applications. Clinical fields (e.g., psychology, psychopathology, neurology) inherently require brief and reliable measurement tools. For instance, the shorter assessment time makes short scales advantageous in some conditions (such as cognitive impairment). In certain applications (e.g., primary healthcare), the ease of using shortened scales allows for identifying underlying psychological disorders that might otherwise go unnoticed (Kemper et al., 2019). Thus, the AES-SF, a self-report measurement tool, can be used in clinical applications in fields like psychiatry and psychology to support information obtained from fundamental measurement tools. On the other hand, in situations without time constraints, researchers and experts in application fields can refer to the 22-item long form, enabling valid and reliable measurements.

The limitations of the research can be listed as follows. Firstly, the study was conducted on a Turkish sample. Examining the psychometric properties of the short form in a different language (such as English) or culture could provide additional information on its validity and reliability. Secondly, all participants in the study filled out the same scale form, and the structural validity and reliability of the short form were tested on one-half of a non-randomly split sample. Therefore, analyses conducted on a third sample where only the eight-item short form is applied could strengthen the validity and reliability of information of the AES-SF. Thirdly, the majority of participants were university students, and the proportion of females was higher than males in gender distribution. When considering that the empathy levels towards animals are generally higher in females than males (Paul 2000), it is expected that a balanced gender distribution and studies conducted on a general population sample could provide useful information for the psychometric evaluation of the scale.

Additionally, the research was conducted with a general sample, similar to the original scale study. Testing the scale in clinical groups could provide information not only on its validity but also on its utility for clinical applications. Lastly, while the sample sizes for the analyses in the study were adequate, the fact that one of the external criterion subdimension scores showed different results for the two forms could be related to the difference in sample sizes. Therefore, convergent validity analyses of the scale can be repeated in a broader sample.

## Conclusion

Valid and reliable measurements can be obtained using the AES-SF. The short form can offer practical benefits for researchers and experts in application fields. The original scale can also be used as a valid and reliable instrument if preferred. Future studies can compare the long and short forms with the same participants in a larger sample from different languages and cultures, alongside additional information like gender distribution and psychiatric diagnosis status, to repeat the psychometric analyses of the short scale. Furthermore, researchers can review the structural validity of the Turkish long scale through confirmatory factor analysis and exploratory factor analysis.

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**Addendum. the Animal Empathy Scale (AES): 8 and 22 item forms (Turkish Version)****Instruction**

Please draw a circle around the relevant number on the agree-disagree continuum to indicate the extent to which you agree with the statements below. For example, if you agree moderately with a statement, please circle the number 7..

|   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
|---|-------------------|---|---|---|---|---|---|---|---|----------------|
|   | Strongly disagree |   |   |   |   |   |   |   |   | Strongly agree |
| 1. Hayvanat bahçesindeki hayvanların üşümedikleri ve iyi beslendikleri sürece kafeslerde tutulmaktan rahatsız olduklarını düşünmüyorum. * | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 2. Kediler aç olmadıklarında da miyavlayıp yemek almak için insanları rahatsız eder. *  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 3. Televizyondaki vahşi yaşam belgesellerinde aslanlar tarafından kovalanıp öldürülen hayvanları görmek beni rahatsız eder.               | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 4. Köpeklerin yalnız bırakıldıklarında havlayıp ulumaları sinirimi bozar. *   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 5. Üzücü hayvan filmleri izlediğimde sık sık, boğazım düğümlenir.   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 6. Hayvanlar kötü bir davranış sergilediğinde cezalandırılmalıdır. *  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>7. Bir hayvanı yalnız başına bir kafes içinde görmek beni üzer.</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>8. Başka insanların yanında evcil hayvanlarına sarılan ve onları öpen insanlar sinirimi bozar. *</b>                                   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 9. Arkadaş canlısı olan ve mırlayan bir kedi neredeyse her zaman neşemi yerine getirir.   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>10. Bakıma muhtaç ve yaşlı hayvanları görmek beni üzer.</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 11. Köpekler bazen ortada geçerli bir neden yokken de sızlanırlar. *  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 12. Birçok insan evcil hayvanlarına karşı gereğinden fazla sevgi gösterir. *  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>13. Hayvanların kötü davranışa maruz kaldığını gördüğümde çok sinirlenirim.</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>14. Birinin evcil hayvanına gereğinden fazla bağlanması bana çok saçma gelir. *</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 15. Evcil hayvanların ruh halim üzerinde büyük bir etkisi vardır.   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>16. Bazen, yaşlı evcil hayvanları öldüğünde, insanların çok üzülmesine şaşırıyorum. *</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 17. Kuşları yemek kıvrıntıları ile beslemeyi seviyorum.   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>18. Hayvanların acı çektiğini görmek beni üzer.</b>  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| <b>19. İnsanlar sıklıkla hayvanların duygularını ve hassasiyetini abartırlar. *</b>   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 20. Köpeklerin selamlamak için zıplayıp yüzümü yalamaya çalışması beni rahatsız eder. *   | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 21. Kaybolmuş gibi görünen bir köpek ya da köpek yavrusuyla karşılaştığımda, her zaman yardım etmeye çalışırım.                           | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |
| 22. Kuşları uçmak için yeterli alanı olmayan kafeslerde görmekten nefret ederim.  | 1                 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |                |

**Scale Scoring*****8-item Short form Scoring***

The short form consists of bolded statements.

Items belonging to the empathic feelings factor: 7, 10, 13, 18

Items belonging to the non-empathic emotions factor: 8, 14, 16, 19

***22-item Long-form Scoring***

The long form consists of all items.

Items belonging to the empathic feelings factor: 3,5,7,9,10,13,15,17,18,21,22

Items belonging to the non-empathic emotions factor: 1,2,4,6,8,11,12,14,16,19,20

Items with an asterisk (\*) are reverse scored in both forms.

In both forms, a single scale score is obtained from the sum of responses to all items. Higher scores indicate an increased level of empathy towards animals.