The Human-Animal Interaction at Work Scale: Development and psychometric properties

Ana Junça-Silva *

Instituto Universitário de Lisboa (ISCTE-IUL), Business Research Unit – BRU (UNIDE-IUL), Lisboa, Portugal

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ABSTRACT

This study aimed to develop and validate the Human-Animal Interaction at Work Scale (HAI@WS). This instrument is designed to measure human-animal interactions during work time. We conducted four studies to achieve this goal. First, we developed the scale, followed by a study to explore its factorial structure (N = 1013). The third study analyzed the scale's internal validity and reliability (N = 253). The fourth study was a daily-diary investigation that assessed the criterion validity of the HAI@WS by examining its within-person correlations with measures of performance, satisfaction, and work engagement (N = 145 × 5 = 725). The findings revealed that the three-item scale represented a single factor and is a reliable measure of human-animal interactions in the work context. Additionally, the results indicated that the scale was significantly related to measures of performance, satisfaction, and work engagement at the within-person level. This study fills a research gap by providing a validated measure for assessing human-animal interactions in the workplace, an area previously lacking such tools. The HAI@WS is valuable for managers seeking to evaluate how the presence of pets at work—whether during teleworking or in the office—and the resulting interactions with employees can satisfy biological and psychological needs, thereby promoting positive outcomes such as work engagement and positive affective work-related experiences. This research advances our understanding of human-animal interactions and their impact on individuals and organizations.

Introduction

Human-animal interactions (HAIs) have been studied and explored from diverse disciplines (e.g., medicine or psychology). HAIs may include physical (e.g., touching the pet), affective (e.g., being near the pet), or cognitive (e.g., perceived support and comprehension by the pet) interactions between humans and "furry beings" (Friedman and Krause-Parello, 2018). The benefits of HAIs include known pets (the individual's own pets) or unknown ones (Bures, 2021).

Even though the consistent findings that HAIs improve well-being, mental health, and overall health (e.g., Friedman and Krause-Parello, 2018; Sable, 2013), and contribute to attenuating stress and anxiety reactions to negative events (e.g., Friedman and Son, 2009), there are only two studies that have explored it in the working settings (Junça-Silva et al., 2022; Junça-Silva, 2023). Moreover, the scarce studies that exist have relied on ad-hoc measures (as opposed to validated measures) that, consequently, may provide unreliable findings due to untrustworthy instruments. Indeed, to our best knowledge, there is no measure that assesses the HAIs for the work context.

Hence, there are some reasons why developing such a measure would be relevant. First, the number of families with pets is increasing, and together with the change in their social representation—nowadays, families tend to see their pets as cherished family members, and not merely as means to an end (e.g., serving to bark as an alarm)—call for the need to explore their intersection with their families' daily life at work. Second, the number of organizations with pet-friendly policies is increasingly higher, some of which have already implemented the "take your pet to work day" or have prepared their facilities to receive their worker's pets on a regular basis (Junça-Silva, 2022; Sousa et al., 2022). Third, HAIs have recently started to attract organizational scholars (Junça-Silva et al., 2022); however, no measure assesses HAIs, and as such, it is hard to provide a holistic overview of the resultant benefits of HAIs in working settings. Thus, organizations and managers may benefit by creating a measure that assesses HAIs during the working day and what benefits may come from it.

* Address for reprint requests and correspondence: Ana Junça-Silva, Instituto Universitário de Lisboa (ISCTE-IUL), Business Research Unit –BRU (UNIDE-IUL), Avenida das Forças Armadas, Lisboa 1649-026, Portugal.
E-mail address: ana_luisa_silva@iscte-iul.pt.

Therefore, this study intends to fill this gap by presenting the newly developed Human-Animal Interaction at Work Scale (HAI@WS), a measure created to evaluate HAIs for the work context. The composite variable—HAIs at work—can provide a holistic view of such interactions during the working day, and develop knowledge of the consequences that it may have on individuals (e.g., job satisfaction and work engagement) and organizational outcomes (e.g., productivity and talent retention by improving the organizational employer branding). Additionally, understanding how it may impact such outcomes may also serve as a way to delineate organizational strategies that match workers' preferences and needs and, at the same time, that may support them. This is particularly important for workers who have pets, for instance allowing them to work from home, albeit in a hybrid mode, or to create facilities that allow workers to take their pets with them to work. Further, the HAI@WS clarifies potential issues related to HAIs during work time and their related outcomes, helping organizations to identify strategies that may improve their worker's work-related well-being.

Theoretical Background

The intersection of pets and organizational life

In recent years, there have been an increased number of families with pets (e.g., Aruah et al., 2019). This increase has been accompanied by changes in the way owners see and interact with their pets (Junça-Silva, 2022c). It is common to see families strolling with their pets or taking them on their holidays. It is also common to observe that individuals treat their pets differently when compared to other generations in the past. For instance, some decades ago, it was common to have pets as mere objects (e.g., to guard the house), whereas nowadays, it is frequent to hear owners treating their pets as "furry babies" or cherished family members (McConnell et al., 2019; Junça-Silva et al., 2022). Hence, we may thereby conclude that pets are conquering a time and a special space in the heart of modern families.

This time and space are being gradually transferred to other domains than the family house. In other words, pets intersect with other contexts (e.g., social and organizational contexts), because they are each time more present in the life of their owners. Hence, it is not surprising their intersection with the work domain (Kelemen et al., 2020). As Kelemen et al. (2020) noted, pets intersect organizations in many ways; however, there are scarce studies that have explored this intersection. From a practical standpoint, this intersection can be evidenced by the increased number of organizations with pet-friendly policies and practices, such as Google (Sousa et al., 2022). For example, Amazon is known as one of the best workplaces due to its pet-friendly practices, such as pet insurance, the "take your pet to work day," the conceived days for the pet's grief, and telework, among other practices. This increased number of organizations adopting pet-friendly practices may be due to their subsequent increased levels of work engagement, happiness, and performance (Kelemen et al., 2020).

Some examples of pet-friendly practices include telework or being allowed to take the pet to work. At work, pets may improve worker's concentration (Junça-Silva, 2022a), affective commitment (Junça-Silva, 2022b), and performance (Junça-Silva et al., 2022) because being allowed to work nearby their pets, from home (teleworking) or at the office, may improve the sense of duty toward the organization. This can be supported by the norm of reciprocity described by the social exchange theory (Blau, 1964). Accordingly, individuals feel more connected and obliged when their organization promotes favorable working conditions, as it is the opportunity to work near their pets (Junça-Silva, 2022b). Hence, pet-friendly practices such as teleworking or being allowed to take pets to work may promote the feeling of gratitude and obligation toward the

organization (Wagner and Pina e Cunha, 2021), which in turn may enhance the worker's work engagement and performance, that is, it triggers a social exchange between worker and organization.

For instance, some studies have shown that organizations that allow their workers to take their pets to work, reduce occupational stress, emotional exhaustion, and anxiety (Wagner and Pina e Cunha, 2021), and improve their health (Mueller et al., 2018). The "pet day at work" also reduces negative affective states and increases positive ones (Barker et al., 2012), as well as improves the quality of the perceived work climate (Wells and Perrine, 2001), and the quality of interpersonal interactions (Cloutier and Peetz, 2016). By being allowed to work near their pets, individuals tend to feel more identified with their organization, which in turn increases their well-being (Junça-Silva, 2022a, 2023) and performance (Junça-Silva et al., 2022). In another study, pet owners appeared to be happier and more productive when teleworking, when compared to days in which they were working at the office, because when working from home, they worked nearby their pets and were able to interact with them during the working day (Junça-Silva et al., 2022).

The concept of human-animal interactions

HAIs have a long tradition of research in other areas, such as medicine or psychology (Friedman and Krause-Parello, 2018). However, there are few studies that have explored it in the working context (for a review, see Junça-Silva, 2022a). HAIs include all the interactions between humans and non-human beings (Friedman and Krause-Parello, 2018) and may include physical (e.g., going to take a walk with the pet), affective (e.g., observing the pet playing with a bone), or cognitive interactions (e.g., perceived support by having the pet nearby).

It has been shown that interacting with pets improves health (e.g., Sable, 2013) and stimulates endogenous oxytocin concentrations—a hormone that has been linked to positive affective states (Marshall-Pescini et al., 2019; Powell et al., 2019), reduces heart rate and blood pressure (Powell et al., 2020), and improves the level of concentration (Barker et al., 2012). Despite the benefits demonstrated, HAIs in the working context have been ignored. Moreover, the scarce existing studies have relied on ad-hoc measures instead of validated scales, which thereby highlights the need for a measure that may assess in an objective way the interactions between workers and their pets during work time.

The Present Study

This study was divided into four studies that aimed to develop and validate a scale that measures HAIs in the work context. We followed scale development best practices (e.g., Worthington and Whittaker, 2006; Zickar, 2020) across multiple samples to describe the development and validation of the HAI@WS, assessing HAIs for the working settings. In study 1, we used three methods (literature review, interviews, survey) and two samples to develop items and refine the measure to a practical four-item scale. In study 2, we rely on a large sample of working adults to validate the factorial structure of the scale and its reliability. Finally, in studies 3 and 4, we further assess the convergent, discriminant, and criterion-related validity of the scale, as well as support its psychometric properties.

Study 1: The Human-Animal Interactions at Work Scale Development

Item generation

Stage 1: Literature review

The HAI@WS was developed in several stages (McCoach et al., 2013). First, an extensive literature review was performed to analyze

Table 1
Identification of the HAIs in general (evidence from the literature review) (study 1).

Human-animal interactions	Reference
Touch the pet	Bennett et al. (2015), Barcelos et al. (2020), Junça-Silva (2022c)
Head petting	Sable (2013), Friedman and Krause-Parello (2018), Junça-Silva (2022a, 2022b, 2022c, 2022d)
Take the pet for a walk	Barcelos et al. (2020)
Being nearby the pet	Sable (2013), Junça-Silva (2022a, 2022b, 2022c, 2022d)
Play with the pet	Barcelos et al. (2020)
Talk to the pet/Share something with the pet	Friedman and Krause-Parello (2018)
Observe/Watch the pet	Barker et al. (2020), Friedman and Krause-Parello (2018), Barcelos et al. (2020)
Provide care for the pet (e.g., food, comb, grooming)	Friedman and Krause-Parello (2018), Barcelos et al. (2020)

studies that were focused on HAIs. Due to the scarcity of studies on HAIs at work, we included studies focused on HAIs in other contexts (e.g., Allen et al., 1991; Friedman and Son, 2009; Sable, 2013; Friedman and Krause-Parello, 2018). At this stage, we identified eight kinds of HAIs (summarized in Table 1).

Stage 2: Interviews

The second stage involved the conduction of 15 interviews with working adults with pets, that have been already either teleworking or were allowed to take their pets to work. Of the overall interviewees, 10 were women, and 5 were men. Their mean age was 42.12 years old (standard deviation [SD] = 5.12), and their mean tenure was 16.22 years (SD = 4.18). All of them had pets—as it was an inclusion criteria and, on average, they reported having 2.48 pets, of which 100% reported having dogs and 26.66% identified having cats. These interviews aimed to understand what kind of HAIs were relevant to consider in the working setting, as in the former stage—the literature review—we based on general studies on HAIs.

The analyses generated five categories of HAIs (see Figure 1): (1) observe the pet (e.g., "*One thing that I usually do when I take my pet to work is to stop working and observe him…*"); (2) (e.g., "*Since I started teleworking, I became much more connected to work, because I can be with my pets and touch them whenever I feel in need of that*"), (3) take a break to talk with the pet (e.g., "*I talk a lot with my pets, sometimes when I am worried about something at work, I talk to them (…) or even to describe what I am doing I watch myself talking to them (pets)*"), (4) head-petting (e.g., "*I really enjoy touching the furr, and petting their head*"), and (5) hearing the pet snoring (e.g., "*sometimes I stop what I am doing just to hear their calmness while snoring*").

Stage 3: Item refinement

Based on the eight dimensions identified in the literature review and the five ones categorized in the qualitative analysis of the interviews, two independent researchers identified four overlapping categories between the ones identified in the literature review and

Table 2
Similarities between HAIs identified in the literature review and the interview's qualitative analysis (study 1).

HAIs derived from literature review	HAIs categories derived from interviews
Touch the pet[a]	Touch the pet
Head petting	head petting
Take the pet for a walk[a]	-
Being nearby the pet[a]	-
Play with the pet[a]	-
Talk to the pet/Share something with the pet	Make a break to talk with the pet
Observe/Watch the pet	Look at/Observe the pet
Provide care for the pet (e.g., food, comb, grooming)[a]	-
	Hearing the pet snoring[a]

[a] Removed from the final pole of items.

those identified in the interviews (see Table 2). Based on that, nine items related to HAIs at work were developed. These were grouped into one category of HAIs.

Subsequently, a third investigator read the items and suggested removing one item with similar content or expression (touch the pet as it was related to head petting). After removing this item, eight items were retained for further evaluation.

Stage 4: Experts panel

Further, an expert panel (comprised of two managers, one psychologist, two human resources managers, a counselor, and a coach) evaluated the eight items, and three items (play with the pet; provide care for the pet; hearing the pet snoring) were removed based on the expert panel's suggestion, leaving five items.

Third, the five retained items were sent to a different expert panel (comprised of an expert in human resources management, an organizational psychologist, two veterinaries, and a manager) for
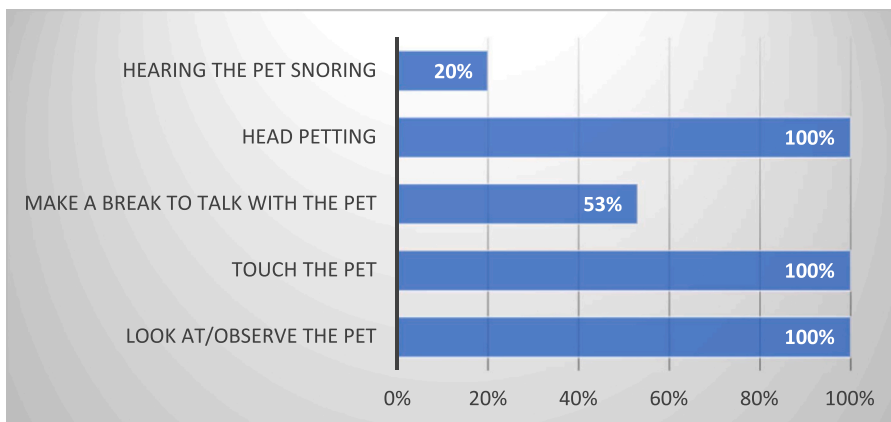

Figure 1. Human-animal interactions—dimensions identified in the 15 interviews with pet owners (study 1).

review. This panel recommended removing two items: (1) "Take the pet for a walk" because it was more related to human-animal activities and not HAIs per se, and (2) "being nearby the pet" because it did not include any kind if interaction between owners and their pets. So, at this stage, we had three final items assessing HAIs in the working context.

Stage 5: Item relevance and clarity: A pilot study

At last, the final 3-item scale was tested on 80 working adults who were able to regularly work near their pets—teleworking or face-to-face (30 men and 50 women, mean age of 28.48 years and seniority = 5.21 years; mean pets: 2.21; pets: dogs (97.5%) and cats (43.75%)) to obtain the initial assessment of it. A five-point Likert scale (1, *nothing understandable*; 5, *completely understandable*) was used to test whether participants understood the items on the scale. The results showed that all respondents understood it ($M = 4.39$, $SD = 0.25$).

In addition, an individual cognitive telephone interview was conducted with the same participants in the pilot study to explore their thoughts about each item on the scale and their responses. Participants indicated that no additional changes were required. Overall, the final version of the scale comprised three items.

Discussion

This first study develops the new HAI@WS to assess the interactions between humans and their pets in the working context. After conducting a thorough literature review, eight categories of HAIs were identified. These categories were then coupled with the results of 15 interviews, then, two panels of specialists and a sample of working adults refined the final item solution. Overall, the final version of the scale includes three items aimed to be used in the working context (either to assess HAIs in teleworking or at the office) to measure HAIs. The second study aims to validate the reliability of the scale, as well as its factorial structure.

Study 2: Validation of the Factorial Structure of the HAI@WS

Following the best practices procedure, study 2 aimed to evaluate the factorial structure of the HAI@WS, and its reliability on a sample of working adults who owned pets (Worthington and Whittaker, 2006; Vesper and König, 2022). By doing so, results may then be generalized across populations, even though we do not rely on a representative sample.

Method

Participants

We collected data from a sample of 1013 pet owners that covered several occupational areas, such as academic (29%), financial (36%), and management (35%). Of the total sample, 61% were female, 50% were graduated, and 39% had high school completed. They had a mean age of 32.73 years old (SD = 12.33) and a mean organizational tenure of 11.57 years (SD = 12.11). On average, they worked about 35 hours per week (SD = 12.70), and 76% of the sample were teleworking. All of them had pets (M = 3.11; SD = 3.04), of which 94% lived in the house (against 11% who lived outside the house). The pets included dogs (76%) and cats (51%). Participants reported having a pet, on average, at 16 years (SD = 8.12).

Exclusion/inclusion criteria

We had two major criteria for the inclusion/exclusion of participants. First, they had to own pets (the type of pet was not a criterion nor was the location of the pet), and second, they had to be in a regime in which they could be able to work near their pets, either

Table 3
Descriptive statistics for the eight items of HAI@WS (study 2).

Items ($\alpha = 0.95$, $\omega = 0.95$) In the past week, while working, how many times did you engage in these kinds of interactions?[a]	M	SD	Loadings
I head-petted/touched my pet(s).	3.14	1.07	0.94
I took a break to talk with my pet(s).	3.03	1.06	0.91
I observed/watched my pet(s) who were near me.	3.12	1.08	0.90

Note. N = 1013.
SD, standard deviation.
[a] Scale response: 0, never; 1, one time; 2, two times; 3, three times; 4, four or more times.

teleworking or working in organizations that allowed them to take their pets to work.

Procedure

We collected data on the HAI@WS online. We emailed the survey link to 254 participants from the researcher's professional networks. In that email, we also sent the informed consent for them to sign, and we assured them of the confidentiality and anonymity of the data. It was also noted that they could withdraw from the study at any time. After answering the survey, we asked them to send the link to other contacts who owned pets and that could work nearby them, using a snowball procedure. Ethical approval was obtained from the University Ethics Committee prior to the study's implementation. Data were collected between October and November of 2021.

Measures

We collected sociodemographic information regarding sex, age, tenure, education, and pets (number, type of pets, and years of pet ownership).

The HAI@WS included the three items identified in study 1 (see Table 3). Participants answered considering the frequency of interactions with their pets, during work time, in the past week. They used a five-point Likert scale (0 = *never*, 4 = *four times or more*) ($\alpha = 0.95$; $\omega = 0.95$).

Data analyses

First, we performed an exploratory factor analysis (EFA) in SPSS (version 28), and then we conducted a confirmatory factor analysis (CFA) in JASP (Love et al., 2019). We evaluated the factor structure with common indices and their cut-off points, in which an adequate and model fit Tucker-Lewis index (TLI) and comparative fit index (CFI) should score above 0.90 and 0.95, respectively (Hu and Bentler, 1999). In addition, standardized root mean square residual (SRMR) and root mean square error of approximation should be below 0.10, 0.08, or 0.05 in order to achieve an acceptable, adequate, and good fit of the model, respectively (Hu and Bentler, 1999; Kline, 2015). We also estimated the internal consistency reliability through Cronbach's alpha and McDonald's omega of the HAI@WS, as suggested by Hayes and Coutts (2020).

Results

Table 3 presents the descriptive statistics for the three items of the HAI@WS.

Exploratory factor analysis

We followed the recommendations of Hayton et al. (2004), and we performed an EFA using parallel analysis in order to determine the appropriate number of factors to extract. Results from the EFA showed that there was only one factor to extract; however, as this method only identifies the number of factors that should be extracted and does not allocate the items onto factors, we performed an additional EFA using maximum likelihood estimation with varimax rotation. This factor explained 91.45% of the variance.
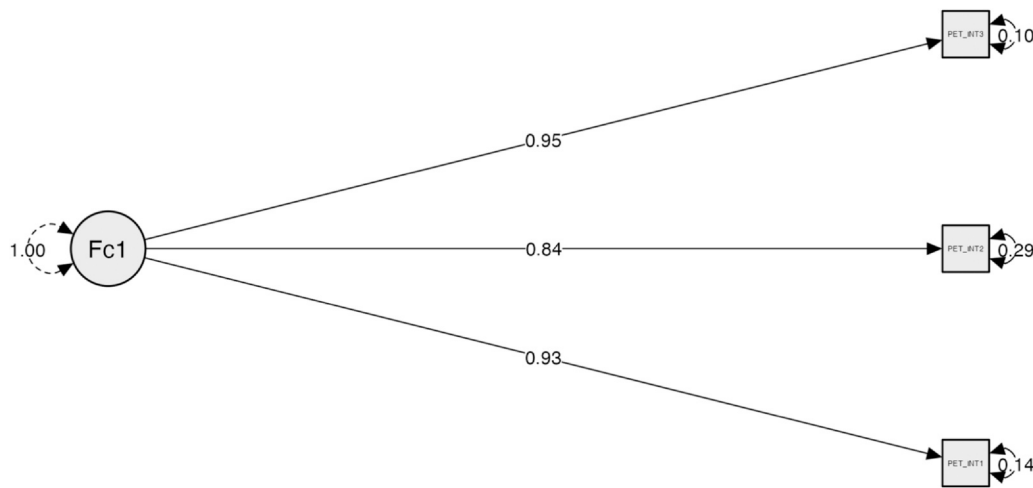
Figure 2. Confirmatory factor analysis and respective standardized factor loadings of the scale (study 2).

Following the best practices procedures, we analyzed the items' loadings to search for those who were < 0.45. As all the loadings ranged between 0.90 and 0.94, we did not eliminate any item on the scale (see Table 3). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.76, which indicated that the data were appropriate for the analysis (Kaiser, 1974). Moreover, the reliability analysis, both with Cronbach's alpha and McDonald's Omega, supported a very good internal consistency for the overall scale ($\alpha = 0.95$; $\omega = 0.95$).

Confirmatory factor analysis

A CFA was performed and supported the one-factor solution of the scale. The resulting model fit the data well; $\chi 2(3) = 384.65$, $P < 0.01$, CFI = 0.99, TLI = 0.99, SRMR = 0.04. The standardized factor loadings were all statistically significant with a $P < 0.01$ and ranged from 0.84 to 0.95 (see Figure 2).

Discussion

This study analyzes the scale's factorial structure and reliability through the conduction of EFA, CFA, and an inspection of Cronbach's alpha and McDonald's omega. The results evidence a good fit solution for the unifactorial structure. Moreover, the scale also presents evidence for internal consistency. The next study intends to assess the convergent and discriminant validity of the scale.

Study 3: Convergent and Discriminant Validity of the HAI@WS

To assess the HAI@WS's convergent and discriminant validity, we conducted the analysis in an independent sample of individuals who owned pets, because this procedure has been identified as a best practice to validate measures (e.g., Vesper and König, 2022; Worthington and Whittaker, 2006), and thus provides more reliable evidence for generalizability that go beyond populations from which the studies draw their conclusions.

To analyze the convergent validity of the HAI@WS, we explored its relationship with the levels of workers' attachment to their pets and their attitudes toward working with them nearby. It is likely that pet owners, while working, feel closer to their pets. Hence, the HAI@WS should be positively related to pet attachment. Likewise, the HAI@WS is expected to be positively related to positive attitudes toward working near their pets (Junça-Silva et al., 2022; Junça-Silva, 2023a, 2023b).

Last, as evidence of discriminant validity, the HAI@Ws should show no significant association with age, sex, or organizational tenure.

Method

Participants and procedure

We collected data from 253 teleworkers who owned pets, of which 71% were female. The mean age was 33.73 years old (SD = 13.81), and the mean organizational tenure was 11.98 years (SD = 13.15). On average, the participants reported working 34.85 hours per week (SD = 16.04). All of them had pets (as this was a criterion for their inclusion in the study; M = 4.26, SD = 7.58), and about 97% had their pets living inside the house. Most participants reported having dogs (75%) and cats (63%). They had pets on average at 15.02 years (SD = 13.62).

To gather data, we placed an advertisement on social media (Facebook and LinkedIn) asking teleworkers, with pets, to participate in a study about perceptions of pets at work. The advertisement included a hyperlink to the online survey. Before answering, they signed the informed consent, which also described the anonymous and confidential nature of the data collection. It was also highlighted that they could withdraw from the study at any time. Data were collected between January and February 2022.

Measures

Human-animal interactions

We used the HAI@WS described in study 2 ($\alpha = 0.92$; $\omega = 0.93$).

Telework pet scale

We used eight items from Junça-Silva (2023) to measure attitudes toward telework based on the perceived benefits that the human-pet bond would have. An item example was "To what extent do you consider that telework is worse or better regarding… your pet's well-being." Participants responded using a five-point Likert scale (1-*totally disagree*; 5-*totally agree*) ($\alpha = 0.93$).

Pet attachment

We used the attachment to pet scale (Zasloff, 1996) to measure how close were the participants to their pets. It included 11 items (e.g., "I get comfort from touching my pet") answered on a five-point Likert Scale (1-*totally disagree*; 5-*totally agree*) ($\alpha = 0.93$).

Results

Reliability analysis showed a good internal consistency for the scale ($\alpha = 0.92$; $\omega = 0.93$). We performed a confirmatory to test the factor structure of the HAI@WS. The findings also supported the

Table 4
Means, standard deviations, and correlations among the HAI@WS and related constructs (study 3).

Variables	M	SD	1	2	3	4	5	6
1. HAI@WS	2.53	0.96	-					
2. Pet attachment	4.46	0.53	0.21**	-				
3. Telework benefits	4.06	0.67	0.43**	0.71**	-			
4. Age	33.73	13.81	0.01	−0.13*	−0.01	-		
5. Sex	-	-	0.09	0.19*	0.00	00.07	-	
6. Tenure	11.98	13.15	−0.00	−0.16*	0.01	0.93**	0.01	-

Note. N = 253. Code sex: 1: male, 2: female.
SD, standard deviation.
* $P < 0.05$.
** $P < 0.01$.

one-factor solution, as the resulting model fit the data well ($\chi2_{(14)} = 43.536$, $P < 0.01$, CFI = 0.98, TLI = 0.96, SRMR = 0.06).

Table 4 shows the pattern of relationships found. As expected, the HAI@WS showed positive and significant associations both with the levels of pet attachment ($r = 0.21$, $P < 0.01$) and the perceived benefits of teleworking for the human-pet bond ($r = 0.43$, $P < 0.01$), which supported the convergent validity of the scale. Moreover, it was not significantly related to age ($r = 0.01$, $P > 0.05$), sex ($r = 0.09$, $P > 0.05$), or tenure ($r = −0.00$, $P > 0.05$). These results supported the discriminant validity of the scale.

Discussion

This study complements evidence from the previous two studies and supports the reliability of the HAI@WS, as well as its factorial validity by demonstrating that the one-factor solution fits the data well. Moreover, the scale also shows good behavior regarding its convergent and discriminant validity, as it is demonstrated by the positive and significant correlations with individual's levels of pet attachment and their attitudes toward telework regarding its perceived benefits for their relationship with their pets (convergent validity). Moreover, the findings show no significant associations between the HAI@WS and age, tenure, or sex, providing evidence for its discriminant validity. The following and last study will test the criterion-validity of the scale.

Study 4: An Inspection of the Criterion-Validity of the HAI@WS

This last study aimed to test the criterion validity of the HAI@WS with a new sample of participants and through a daily-diary study conducted during five consecutive working days.

Research has shown that HAIs, in general, have several benefits for the individual, including better health (e.g., Sable, 2013), well-being (Barcelos et al., 2020), and daily positive behaviors (Bowen et al., 2020). At work, research on HAIs is scarce (Kelemen et al., 2020). However, the few existing studies have demonstrated that working nearby pets, through for instance pet friendly-practices, or pet-friendly workplaces, leads to positive outcomes for the individual (e.g., job satisfaction, organizational identification) and organizations (e.g., performance) (e.g., Wagner and Pina e Cunha, 2021; Junça-Silva et al., 2022; Sousa et al., 2022); hence, the HAI@WS must be positively related to adaptive performance, job satisfaction, and work engagement, thereby evidencing criterion-related validity.

Method

Participants and procedure

In this study, participated 145 working adults who had pets on their own. They were from diverse occupational areas, including marketing (38%), finance (33%), and education (29%). Of the overall sample, 73% were female, with a mean age of 32.10 years old

(SD = 13.51), and a mean organizational tenure of 10.29 years (SD = 12.50). Participants reported working about 32 hours per week (SD = 17.04). Most of them had, at least, a bachelor (78%). They had, on average, 4.96 pets (SD = 8.35), of which 81% were dogs, and 64% were cats. Most of them lived in the house (99%), and on average, participants reported having pets at 16.09 years (SD = 13.64).

We emailed individuals who owned pets—as this was an inclusion criterion—from our professional networks. We asked them to participate in a study about the perceived effects of pet-friendly working climates. Those who answered this email received another one that briefly explained the procedure of the study, clarified the anonymity and confidentiality of the data, and assured that participation could be withdrawn at any moment during the study. We also asked them to sign an informed consent. Those who signed it received another email with the hyperlink for the general survey—containing the sociodemographic measures. In the following week, they started the daily diary surveys, from Monday to Friday. Every day they received a reminder to answer the daily survey, at 6 pm. They had to answer by 10 pm. These daily diary surveys included measures of HAIs, adaptive performance, job satisfaction, and work engagement. From the 205 emails sent, 145 participants completed the five daily surveys (response rate: 71%), which means 725 measurement occasions. The period of data collection was in April 2022.

Measures

HAI@WS

We used the scale from the previous studies ($\alpha = 0.93$; $\omega = 0.94$).

Job satisfaction

We used three items from Sharma and Stol (2020) to capture daily job satisfaction. An item example is: "Today, I would say that I am satisfied with my job." Participants rated their answers on a five-point Likert scale (1 = *totally disagree*; 5 = *totally agree*) ($\alpha = 0.88$; $\omega = 0.89$).

Performance

We measured adaptive performance with three items (Griffin, et al., 2007) that asked participants to identify how often, in that working day, they had adapted to changes (e.g., "Today, I adapted well to changes in core tasks"). They answered on a five-point Likert scale (1 = *very little*, 5 = *a great deal*) ($\alpha = 0.76$; $\omega = 0.80$).

Work engagement

To measure work engagement, we used the ultra-short measure of the Utrecht Work Engagement Scale (Schaufeli et al., 2017). It includes three items: (1) "Today, at my work, I felt bursting with energy" (vigor); (2) "Today, I was enthusiastic about my job" (dedication); (3) "Today, I was immersed in my work" (absorption). The responses were given using a five-point Likert scale, ranging from 1 (*never*) to 5 (*always*) ($\alpha = 0.86$; $\omega = 0.87$).

Results

Confirmatory factor analysis

We performed CFA using R to test the multilevel CFA. The results supported the one-factor solution evidenced in studies 2 and 3. The model fit proved to be adequate to the data ($\chi2_{(21)} = 43.54$, $P < 0.01$, CFI = 0.98, TLI = 0.96, SRMR = 0.06). In addition, reliability analysis also showed a good internal consistency for the scale ($\alpha = 0.93$; $\omega = 0.94$).

Descriptive statistics and correlations

Table 5 shows the descriptive statistics and the correlations between the variables. As expected, the HAI@WS correlated

Table 5
Means, standard deviations, and correlations among the HAI@WS and related constructs (study 4).

Variables	M	SD	1	2	3	4
1. HAI@WS	3.79	0.62	-	0.18**	0.20**	0.31**
2. Adaptive performance	3.59	0.75	0.36**	-	0.47**	0.16**
3. Work engagement	3.67	0.74	0.16*	0.19**	-	0.15**
4. Job satisfaction	4.01	0.72	0.19**	0.75**	.13	-

Note. $n = 145 \times 5 = 725$.
Correlations below the diagonal are between-person levels. Correlations above the diagonal are within-person level.
SD, standard deviation.
* $P < 0.05$.
** $P < 0.01$.

significantly and positively with measures of job satisfaction (r_{within} = 0.31, $P < 0.01$, $r_{between}$ = 0.19, $P < 0.01$), adaptive performance (r_{within} = 0.18, $P < 0.01$, $r_{between}$ = 0.36, $P < 0.01$), and work engagement (r_{within} = 0.20, $P < 0.01$, $r_{between}$ = 0.16, $P < 0.05$), both at the within-and between-person level of analysis. Hence, these results evidenced the criterion validity of the scale.

Discussion

The results of this study are consistent with previous ones in what concerns the reliability and factorial structure of the scale. Moreover, the results also show that the scale presents criterion validity as it is closely related to several positive indicators, such as adaptive performance, job satisfaction, and work engagement, both at the daily and individual levels.

General Discussion

Recent research has demonstrated that working near pets, either by taking the pet to the office or by working from home near them, led to several positive outcomes for the individual (e.g., well-being; Wagner and Pina e Cunha, 2021) and for organizations (e.g., performance; Sousa et al., 2022). Given the recent increase in the adoption of telework—due to the COVID-19 crisis—pet owners got used to working close to their pets (e.g., Junça-Silva et al., 2022); hence, it is relevant to understand how this may influence their behavior and attitudes. However, the studies, so far, have used ad-hoc measures instead of validated scales for this purpose. Hence, the set of four studies aims to validate a measure that may be helpful to deepen the knowledge about HAIs during work time, thereby filling this gap in the literature (Kelemen et al., 2020).

First, the HAI@WS presents a consistent one-factor structure that aims to measure different kinds of interactions between humans and their pets. This factor structure is demonstrated across three studies (studies 2, 3, and 4). This consistency suggests that the scale may be applied in different research models (e.g., cross-sectional, diary, or longitudinal designs). Moreover, the evidence of reliability—across the studies—makes the HAI@WS a reliable measure to evaluate the frequency of HAIs and how it may influence several aspects of work (e.g., performance) or individual attitudes (e.g., work engagement).

At last, the results show that the scale has convergent, discriminant, and criterion-related validity, as it is shown by (1) the significant relationships with several indicators and (2) the non-significant associations with age, sex, and tenure, which in turn shows its applicability across different populations. This result highlights that the HAI@WS may be a suitable indicator of HAIs in working settings (both teleworking or face-to-face contexts). The associations between the HAI@WS and indicators of adaptive performance, work engagement, and job satisfaction are in line with recent demonstrations that working near pets enhances the workers' focus on the tasks, which in turn improves performance

(e.g., Linacre, 2016; Junça-Silva, 2022a). This is explained, in part, because when individuals work close to their pets, they do not need to worry about leaving them home alone, which may result in higher concentration on the tasks to be done (Barker et al., 2012), and enhance their adaptivity when needed (Friedman and Krause-Parelo, 2018). Furthermore, recent studies also showed that working with pets nearby contributes to attenuate the negative impact of job uncertainty on negative affect (Junça-Silva, 2023b) and also improves positive attitudes at work, such as organizational identification and work engagement (e.g., Junça-Silva et al., 2022), and well-being indicators, such as positive affect, job satisfaction, and perceived health (Cunha et al., 2019; Wagner and Pina e Cunha, 2021; Powell et al., 2020).

Overall, the HAI@WS appears to be a reliable and valid measure of HAIs to be applied in the working context. Hence, this scale may be helpful to deepen the understanding of this topic and what benefits it may deliver both to workers and organizations.

Limitations and future research directions

This set of studies has some limitations. The first is related to the sample as we do not have a representative sample of pet owners who can work near their pets. However, we must consider that we have a multi-study and multi-method approach to validate the scale. Hence, the different studies, relying on different samples, and different methods are an added value to the study and thus strengthen these conclusions.

Future studies should explore the HAIs at work, using the new scale, through daily designs or a multi-daily data design (for instance, through collecting data more than once per day). Daily designs are particularly important when it is important to consider daily fluctuations, as behavioral, attitude, and affective states tend to have (Griffin, et al., 2007). Moreover, future research should also investigate the extent to which working near pets when teleworking may predict health-related indicators on a daily basis (e.g., mental health).

Conclusion

The increasing concern of families about their pets—as their family members (Kelemen et al., 2020)—together with the improved number of organizations with pet-friendly practices, makes the HAI@WS a measure long overdue and sorely needed. This overdue has contributed to the field's incomplete understanding of how HAIs during work may influence several indicators, such as performance or well-being. The HAI@WS matches this need as it evidences good psychometric properties regarding its factorial structure, reliability, and validity (convergent, discriminant, and criterion-related).

Informed consent

Informed consent was obtained from all individual participants involved in the study.

Ethical Considerations

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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