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Social Preference of Human-hand raised and Socialised Wild Boars

Preferência Social em Javalis Socializados e Criados pelo Homem

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ABSTRACT

Discriminating familiar individuals from unfamiliar ones is an adaptive capacity of social species, which is reported not only intraspecifically but also interspecifically, particularly with humans. Moreover, there are also reports of wild social species, which if socialised positively and early with humans, can prefer and discriminate a familiar human. Our study aims to investigate the social preference between a familiar person (FP) and a stranger (S) or a familiar object (FO) in socialised and human-hand raised wild boars. Four wild boars were used in this study, which was divided in: Test 1 - Stranger vs. Familiar Person (n=3), and Test 2 - Familiar Object vs. Familiar Person (n=4). The experiment consisted of releasing one wild boar at a time at a starting point, which was equidistant from the two interveners, and recording their behaviour for three minutes. Using *Solomon coder*, we analysed and quantified the following behaviour variables: *Near Near, Near, Contact, Zone, Away, First approach the 'targets', Contact ratio* and *Preference index*. The statistical data analysis, performed in *R*, revealed that, in both tests, wild boars approach firstly and more frequently the familiar person. They show a preference of being in the *Social Area* rather than in the *No Social Area*, such as being close to the FP rather than the S, but no preference between being close to the FP over FO. In addition, they spent more time around the familiar person in Test 2 than Test 1. Despite the small sample, our study suggests that socialised and human-hand raised wild boars prefer and discriminate the familiar person, highlighting the importance of intense and positive socialisation on social preference and understanding that domestication might be just a social interspecies facilitator. This study was the first carried out under social preference in socialised and human-hand raised wild boars.

KEY WORDS: ‘social preference’, ‘wild boars’, ‘hand raised’, ‘human discrimination’**.**

RESUMO

A discriminação entre indivíduos familiares e não familiares é uma capacidade adaptativa de espécies sociais, que é reportada tanto intra-especificamente como inter-especificamente, nomeadamente com humanos. Além disto, encontra-se descrito que espécies selvagens sociais, se socializadas positivamente e precocemente com humanos, podem preferir e discriminar um humano familiar. O nosso estudo tem como objetivo investigar a preferência social entre uma pessoa familiar (FP) e um estranho (S) ou um objeto familiar (FO) em javalis socializados e criados por humanos. Neste estudo foram utilizados quatro javalis, em dois testes diferentes: Teste 1 - Estranho vs. Pessoa Familiar (n=3), e Teste 2 - Objeto Familiar vs. Pessoa Familiar (n=4). O protocolo experimental consistiu em soltar um javali de cada vez, a partir de um ponto de partida equidistante entre os dois intervenientes, e registar o comportamento do mesmo durante três minutos. Através de *Solomon coder*, analisamos e quantificamos as seguintes variáveis comportamentais: *Perto Perto, Perto, Contacto, Zona, Longe, Primeira aproximação aos "alvos", Rácio de contacto* e *Índice de preferência*. A análise estatística, realizada no *R*, revelou que nos dois testes os javalis se aproximam primeiro e mais frequentemente da FP. Estes demonstraram preferência em estar na *Área Social* em vez da *Área Não Social*, assim como por estarem mais próximos da FP do que o S, mas sem preferência entre estar perto da FP ou do FO. Para além disso, passaram mais tempo junto da FP no Teste 2 do que no Teste 1. Apesar da pequena amostra, o nosso estudo sugere que os javalis socializados e criados por humanos preferem e discriminam a pessoa familiar, destacando a importância da socialização intensiva e positiva na preferência social e compreendendo que a domesticação possa ser apenas um facilitador social interespécies. Este foi o primeiro estudo realizado no âmbito da preferência social em javalis socializados e criados por humanos.

PALAVRA-CHAVE: “preferência social”, “javalis”, “criação por humanos”, “discriminação de humanos”.

Casuistic and Released Activities

- Elaboration of the protocol of the Social Preference tests with wild boars.

- Experimenter on Social Preference tests with wild boars.

- Coding and data analysis the Social Preference tests.

- Merging videos from Human approach and Social Preference tests.

- Assistance on wild boars' behaviour tests: *pointing, gazing, human approach, emotional cue preference, approach-avoidance with conspecific and bubu sound.*

- Involvement in an environmental enrichment of wild boars' arena.

- Assistance on 'Neural entrainment as a correlate of speech sensitivity in hand-raised wild boar piglets' – an EEG study.

- Observance of Dog's behaviour studies: 'Dog's separation-related behaviour in the presence of a novel social partner' and 'Influence of vocalization on the recognition of a robot as a social partner'.

- Observance of dog training to be able to realise fMRA studies without anaesthesia.

- Involvement on the department's demonstration to veterinary students.

- Participation in *Ethorquestra*.

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ABBREVIATIONS

% Percentage

ºC Celsius degrees

p p-value

P Predictions

FO Familiar Object

FP Familiar Person

FP_FO Test 2 – Familiar Object vs. Familiar Person

FP_S Test 1 – Stranger vs. Familiar Person

H Hypothesis

ID Identification number

m Metros

N Number of samples

s Seconds

S Stranger

SD Standard Deviation

1. INTRODUCTION

As inhabitants of the same world, the interaction between humans and non-human animals is inevitable. Sharing the same environment over time led to close and frequent interactions between humans and some animals, where displaying effective socio-communicative behaviours became essential (Bryant, 1979). Social interaction and non-ambiguous communication with animals have brought benefits for humans, as cooperation for working related purposes, companionship, research, and better handling of livestock production (Gascon et al., 2015; McCune et al., 2014; Michalk et al., 2019). Importantly, this relationship is also advantageous to the other side, the non-human species, since it allows them to gain protection (environmental and interspecific), food and companionship (Alders et al., 2021; Mota-Rojas et al., 2020).

The process of domestication increased the human-animal interactions and improved interspecific communicational abilities, since domestic species passed through cognition and behaviour changes which enhanced their tolerance towards human proximity and their sensitiveness to human communicative signals. Not only that, but as humans are often the most important social stimuli for some domestic animals, other abilities like discrimination of familiar and unfamiliar humans or preference have been also widely proved in domestic species (Driscoll et al., 2009; Kulick, 2017; Rault et al., 2020). In this regard, most of the studies suggest that the domestication is the key factor behind interspecific discrimination abilities and human-social preference. However, just a few studies have been done on wild animals in this topic, and it seems that not only domestic but also some non-domestic species tolerate the presence of humans, showing even and similar sensitiveness to humans' social signals and communicative behaviours (Leroux et al., 2018; Miklósi & Soproni, 2006). Nevertheless, the results mentioned above, together with new research point towards the idea that domestication may not be an essential prerequisite for the emergence of human-oriented socio communicative abilities in animals. Instead, domestication could act just as a facilitator of these abilities (McElligott et al., 2020; Pérez Fraga, 2023).

1.1. Social preference

Intraspecific communication is a key ability in social species, allowing them, among other functions, to distinguish between conspecifics and understand if those individuals are part of their group or not and, by extension, to create bonds and to survive (John Smith, 1969).

Regarding the interspecific level, human can both represent a threat or benefit to other species. For this reason, some animals seem to have supposedly developed mechanisms to understand human communicative signals and to act according to that (Johann et al., 2020; Miklósi & Topál, 2013). Previous research has suggested that domestic animals and some non-domestic animals with an early,

repeated, and positive human interaction experience, can consider a human as part of their social group (Leroux et al., 2018; Miklósi & Topál, 2013). Consequently, as it is fundamental to distinguish individuals from the same group in comparison to others, it also seems essential for animal species to discriminate among familiar and unfamiliar humans when sharing the same environment. Therefore, early, repeated, and positive human interaction with non-domestic species could be enough for them to be able to discriminate, and even prefer, a familiar human over an unfamiliar one. To test this effect, we propose to study a wild social species, the wild boar, exposed to intense socialisation with humans during ontogeny.

1.1.1. Relation with domestication: Dogs vs. Wolves

Domestication is a phenomenon that led over thousands of years to a closer human-animal relation (Lazzaroni et al., 2020). Dogs *(Canis familiaris*) are a good example, as their long and specific selection for cooperation with humans have resulted in their ability to form a unique attachment bond with humans. This has been proposed as the basis for dog's exceptional human-oriented social abilities, social learning skills and cooperativity with humans (Miklósi & Topál, 2013).

This presumes their ability to discriminate familiar over unfamiliar humans and to respond in a different way to their attachment figure, since dogs prefer their owner over another person, object or even conspecific (Ryan et al., 2019; Topal et al., 1998). However, Gácsi and colleagues (2005) suggests that at the age of 5 weeks, the dogs' preference toward humans is not restricted to the caregiver but generalised to other humans. Even socially deprived adult dogs can show an attachment behaviour to a stranger after a short social handling (Topál et al., 2005).

In contrast to dogs, wolves (*Canis lupus*) (their wild relative) do not share a similar attachment bond with humans (Miklósi & Topál, 2013). In fact, they show a preference for a canid partner over a familiar human, suggesting in this case that domestication could have changed this preference in dogs (Frank & Frank, 1982). However, despite the attachment is not present in wolves, if they are intensively socialised with humans since puppies, they tend to prefer their caregiver over a stranger, and can even see the familiar human as a social partner (Range & Virányi, 2013; Virányi et al., 2008). In the study by Gácsi and colleagues (2005), 4-weeks-old wolves prefer the caregiver over the presence of another human or canid (novel stimulus), but at 5 weeks of age this preference is masked. In this study they suggested that the novel stimulus can evoke firstly some fearfulness (besides the exploratory behaviour) and after that can assume a social stimulus evoked exploratory behaviour (Gácsi et al., 2005). In this regard, domestication might not be the exclusive key for social preference.

1.1.2. Relation with domestication: Domestic Pigs vs. Wild Boars

Regarded as highly interactive with members of their same group, pigs (*Sus scrofa domesticus*) are a social species with a highly intraspecific sociability and communication (Pérez Fraga et al., 2021). Thereby, discrimination between familiar and unfamiliar individuals is fundamental for their social structure (Pérez Fraga et al., 2020). Weaning is a critical period in their social development, therefore social interactions with humans during this period have a strong impact on the pigs' development (Hemsworth et al., 1986).

A positive relation between pigs and humans is important since it leads to improved welfare, health, and an increase in productivity (Reimert et al., 2017). Studies on the voluntary approach of farm pigs to humans have been extensively conducted to assess the quality of human handling (Marchant et al., 2003). Accordingly, pigs experiencing positive and regular handling show a higher propensity to approach and to physically interact with the handler (Brajon et al., 2015; Tanida et al., 1994). In the opposite, pigs with negative experiences with humans have been shown to avoid the handler (Tanida et al., 1994).

Furthermore, previous studies suggest that laboratory pigs can discriminate between a stranger and the handler, and companion pigs prefer their owner over a familiar object or a stranger person (Brajon et al., 2015; Pérez Fraga et al., 2020; Tanida et al., 1994; Tanida & Nagano, 1998). Pigs can differentiate between a familiar and an unfamiliar human based on olfactory cues together with visual characteristics such as the face or the body (Koba & Tanida, 2001). Moreover, they can even discriminate and generalise responses according with past experiences and degree of similitude with human and, consequently, adapting those behavioural responses with a stranger (Brajon et al., 2015).

Regarding wild boars (*Sus scrofa*), to date, there is no literature available about human-oriented social preference. Despite being very similar to domestic pigs genetically and behaviourally, wild boars are not domestic animals, therefore, it would be possible to assume that they do not form a strong bond with humans, which might lead them to show no preference among those. However, if intense human socialisation is more impactful than domestication, wild boars socialised with humans could exhibit a different response in terms of social preference.

1.2. Swine Domestication

Until the early Holocene, wild boars were important prey for hunter gatherers in Eurasia but with domestication (12000 calendar years ago) this relation changed, jointly with another species, like goats, sheep, etc. (Desse & Audoin-Rouzeau, 1993; Redding et al., 2005; Zeder, 2012). The domestication process of wild boars (Sus *scrofa*) into pigs (Sus *scrofa domesticus*) occurred in at least six different areas including mainland Southeast Asia (Albarella et al., 2006). Frantz and collaborators

(2016) propose that the local Eurasian wild boar is the ancestor of domestic pigs, however, there is some evidence that Asiatic wild boar species (Sus *scrofa vitattus*) could also have been involved on the lineage, which is not unreasonable since these two ancestors could interbreed easily (Giuffra et al., 2000).

Researchers suggest that there were two pathways involved responsible for this process (Zeder, 2012):

- The commensal pathway: swine approach humans first attracted by humans' refusal food or to prey on other animals which were also attracted to human settlement;
- The prey path: humans start to approach the animals to hunt them for their meat and breed them in response of lack of animals in the area.

The fact that pigs are omnivores makes the approach to human population possible, which supports the commensal pathway (Albarella et al., 2006). Although it is not certain which pathway was responsible for pigs' domestication, the suggestions point out that both happened. Accordingly, both suggestions lead to mutualism between species since pigs started to become dependent on humans to get food and humans started feeding themselves with pork without having to hunt (Zeder, 2012). Like this, pigs became a meat and food-waste recyclers (Albiach-Serrano et al., 2012). Domestication facilitated genetic and environmental adaptations in pigs over generations, driven by convergent and divergent processes and influenced by natural selection (environmental changes) and artificial selection (human selective pressures) (Albiach-Serrano et al., 2012; Virányi et al., 2008). In opposite of which is seen between dogs and wolves, pigs and wild boars do not have a completely genetic isolation, because of a continuous breeding between the pigs leaking from farms and wild boars spreading (Albiach-Serrano et al., 2012). Due to this mix, *Sus scrofa* and *Sus scrofa domesticus* are similar in some capacities, such as spatial memory, especially when associated with food (Albiach-Serrano et al., 2012). As a consequence, both pigs and wild boars are able to discriminate places by the quantity of food and to communicate to their conspecifics this information (Albiach-Serrano et al., 2012).

1.2.1. Physiologic and Behaviour differences between Wild Boars and the Domestic Pigs

As a result of human closeness, domestic species are more gregarious, playful, receptive, and less fearful to humans than wild animals (Virányi et al., 2008). In turn, they are suggested to be less cautions, which seems to decrease their ability to cope with environmental changes or challenges (Albiach-Serrano et al., 2012).

Pérez Fraga and colleagues (2023) concluded that pigs do not have a human-oriented referential communicative capabilities and that neither domestication nor intense human socialisation are enough for this capability to emerge. In addition, since pigs have a lack of human reading capability, they are less responsive to human facial pattern, so they fail on following human visual cues (Pérez

Fraga et al., 2023). However, domestic pigs can discriminate between positive and negative human meaningless speech, in contrary to wild boars (Maigrot et al., 2022).

Despite their close relation with humans, pigs were not selected as companions by humans in early times, resulting in a less developed human social cognition (Albiach-Serrano et al., 2012). Consequently, they exhibit high similarity to their closest wild relatives, the wild boars (Albiach-Serrano et al., 2012). This was seen at Albiach-Serrano and colleagues (2012) study, where wild boars (not raised in close contact with humans) and domestic pigs performed similarly in both physical and social tasks with humans. In Maigrot and collaborators (2022) study, it was observed that while wild boars react more strongly to negative emotions, pigs react more strongly to positive emotions.

There is a notorious difference in physical appearance between a wild boar and a domestic pig, and recent studies also indicate a significant karyotype variation between the two species (Albarella et al., 2006; Gustafsson et al., 1999). Moreover, the brains of these two species exhibited significant variation in terms of size and shape (Kruska, 1970). Pigs have approximately 34% smaller brain weight relative to the body weight, compared to wild boars (Kruska, 1970, 2005, in publication). They exhibit a 40% reduction in the structure of the limbic system, which Maigrot and colleagues (2022) suggest that it is responsible for less emotional reactivity (Kruska, 1970). In addition to this, also the medulla oblongata, mesencephalon, cerebellum, diencephalon, and telencephalon are reduced in domestic pigs (ordering from smallest to strongest reduction) (Kruska, 1970). Furthermore, it is described a 20% reduction of the olfactory system size, as well as motor, optic, and acoustic system reductions in pigs compared to wild boars (Kruska, 1970). Kruska (2005) suggested that these evolutionary changes are a result of domestication due to the animals' reduced need to use these structures, leading to reduction of the central nervous system.

1.2. Wild boars as a model species

1.2.1. Origin and behaviour

The superfamily *Suiodae* (also known as Suina or Suiformes) includes the families *Tayassuidae* in the Americas, and *Suidae* in Eurasia, which wild boars (Sus *scrofa*) are part of (Frantz et al., 2016). Frantz and collaborators (2013) indicate that Southeast Asia is the origin area of the ancestor of *S. scrofa* group in the early Pleistocene and, during the time after, the group spread over Europe and all Asia.

Wild boars follow an organized social structure composed of female groups and solitary males, which meet the females during the mating season (Poteaux et al., 2009). A stable food hierarchy is also

considered very important to avoid unnecessary competition, save energy and promote cooperative behaviour (Erdtmann & Keuling, 2020).

The wild boars' breeding occurs primarily in spring and as mammals maternal care has a huge importance on their survival, providing the essential care on behaviour, feeding and environmental needs. These may show the importance of maternal behaviour on the piglet's behaviour and, consequently, on the future full-grown animal (Albarella et al., 2006; Gustafsson et. al, 1999). In addition, pheromones on boar saliva and sow mammary skin secretions are essential for reducing the piglets' aggressive behaviour (Sankarganesh et al., 2021, 2022).

Sus *scrofa* is a diurnal species, however, as a consequence of human hunting, they can have nocturnal activity, indicating the possibility of a circadian circle adjustment according to local environmental conditions (Barone et al., 2018; Johann et al., 2020). Consequently, the habitat is chosen to avoid human encounters, leading to the preference for more covered space (Johann et al., 2020; Thurfjell et al., 2013). Because of this, the forest is their preferred habitat (Barone et al., 2018; Zonderland et al., 2008).

Wild boars are omnivores with a highly plastic diet and a wide geographical distribution (Barrios-Garcia & Ballari, 2012). Food availability, energy requirements, seasonal variation, and geographical differences are the primary factors which influence food selection, therefore, there is an adaptation of the diet based on these parameters and on human activities (Ballari & Barrios-García, 2014). Johann and colleagues (2020) describe that during spring and summer, the foraging decrease because of the higher food availability, however, the activity level is higher in these seasons. The opposite occurs on winter, where it is necessary to pursuit longer distances to find food with a lower energy budget (Johann et al., 2020).

As prey animals, locomotion, vigilance, and foraging are prioritized over personal hygiene, sexual, and resting behaviours, which are typically observed in safe places and predominantly during the later hours of the night (Erdtmann & Keuling, 2020).

Wallow is a common behaviour in swine species, mainly made in mud (Frädrich, 1969). Because of their thick skin with few subaqueous and apocrine glands, subcutaneous fat and bristle hair cover, the thermoregulation becomes difficult in hot temperatures, therefore, wallow has an important role on this (Bracke, 2011; Frädrich, 1969). Besides thermoregulation, Bracke (2011) propose that wallow might also be used to sunburn protection, ectoparasites removal, modify body smell, resting comfort or play. In addition, the swine's hoof structure gives them the capacity to walk easily on soft and moist surfaces, such as mud (Frädrich, 1969).

Since pigs are prey animals, their typical reaction to unfamiliar objects or locations is fear, which may manifest as freezing, high-pitched vocalization, defecating and urinating (Koba & Tanida, 1998; Reimert et al., 2017). However, when feeling secure, they can display a wide repertoire of

behaviours such as playing, barking, and tail wagging, indicating positive emotions (Reimert et al., 2017).

1.3.2. Boar's sensory capacities

Wild boars' olfaction is considered the most crucial sense, as it is essential for foraging and avoiding predators. Additionally, it plays a vital role in intraspecific communication through actions such as defecating, urinating, rubbing, nibbling, nose-to-nose contact, and nose-to-body contact, which can lead to fights, playing, or mating (Erdtmann & Keuling, 2020). As result of this, in humid and windy conditions the detection of olfactory stimuli is higher, which increases the possibility of finding food resources and reduces the possibility of being hunted, resulting in an increased foraging (Lemel et al., 2003).

There is no detailed literature available about wild boars' sensory capacities, however, regarding the phylogenetic closeness with domestic pigs, we can assume that the characteristics might be similar (Albiach-Serrano et al., 2012). Therefore, pigs possess a complex olfactory system, as they heavily rely on their sense of smell. However, their intraspecific communication may also involve auditory and gustatory signals, with visual signs playing a lesser role (Reimert et al., 2013; Sankarganesh et al., 2022). Due to their prey status, the visual selection of this species favoured a larger lateral visual angle to scan predators, rather than optimizing visual acuity (Pérez Fraga et al., 2023). In addition, the rigidity of their neck leads to less head movement and, consequently, less visual breadth. Regarding these characteristics, pigs depend primarily on olfactory and auditory signals, followed by tactile and visual cues (Pérez Fraga et al., 2021). Their vision is limited by having few cone cells, which allows them to distinguish only a few colours (blue from grey) under higher illuminations, resulting in monochromatic vision with lower illumination (Johann et al., 2020; Pérez Fraga et al., 2021). Although they cannot adjust their eyes to low light intensities, their tapetum lucidum can reflect the received light, which increases their visual capacities at dawn, dusk and moonlight (Pérez Fraga et al., 2021).

2. AIMS

Knowing that:

- Wild animals can show preference and discrimination between individuals and consider human as a social partner if there is an early, consistent, and positive interaction (Leroux et al., 2018; Miklósi & Topál, 2013; Ryan et al., 2019; Topal et al., 1998);

- Past research has shown that domestic pigs can discriminate and have different behaviour responses and approaches between the handler and a human stranger or a familiar object (Brajon et al., 2015; Pérez Fraga et al., 2020; Tanida et al., 1994a; Tanida & Nagano, 1998);

- The lineage between wild boars and their domestic relative (the pig) is very close, being both highly social species. Thus, wild boars are a suitable model to understand if a non-domestic animal, when socialised with humans since birth, can demonstrate social preference for a familiar human.

Considering the above, this master dissertation has the objective of investigate the social preference and discrimination between familiar and unfamiliar humans in human-hand raised and socialised wild boars, through the interveners: Familiar Person (FP), Stranger (S) and Familiar Object (FO).

2.1. Hypothesis (H) and Predictions (P)

H1. Early and intense exposure to human positive handling is the most significant factor influencing the emergence of interspecific social preference and discrimination between a familiar human over a non-familiar one in a highly social species, even in non-domestic animal.

P1. Wild boars will exhibit preference for the FP over the S.

H2. Intense human socialisation is not enough to trigger social preference discrimination, but it influences the preference for a social agent over a non-social.

P2. Wild boars will exhibit preference for the FP and S over a FO.

H3. Preference for a FP can be a characteristic of domestic animals. Because of this, the exposure of a wild animal socialised with humans to human social stimuli is not enough to promote a preference or discrimination for a person.

P3. Wild boars will not choose a FP over a S or over a FO.

3. Methods and Materials

3.1. Study animals and housing conditions

This study is part of a bigger test battery, which has the aim of researching the social and communicative behaviours of hand raised wild boars. The experiments were performed in Budakeszi Vadaspark, Hungary, with 4 wild boar piglets (*N=4*) – 1 female and 3 males (Table 1) – which were human-hand raised since their birth.

Table 1. Subjects' information.

Identification number	Name	Birth date	Sex	Age at study	Pictures
VI	Tony	2023.03.31	Male	8 months	
V	Gina	2023.03.21	Female	8 months	
II	Stan	2023.05.14	Male	6 months	
I	Pan	2023.05.14	Male	6 months	

The age average of the subjects in the beginning of the study was 7.14±0.94 months (mean ± standard deviation, SD), increasing to 7.43±0.93 months by the end.

The habituation time and the contact with humans remained constant from the beginning of the tests until their conclusion. The animals lived together as a stable group in an outdoor arena, where the tests were conducted.

3.2. Experimental procedure

The duration of this study was six weeks (24th October 2023 to 2nd December 2023). The wild boars were tested between one to three times a week, and never more than one time *per* day. Two different tests were conducted during this time: Test 1 – Stranger vs. Familiar Person (FP_S) and Test 2 – Familiar Object vs. Familiar Person (FP_FO). In this last test (FP_FO), the four wild boars were used, while in the first test (FP_S), only three wild boars were used (1 female and 2 males). The older male (Table 1) was deselected in Test 1 for security reasons to protect the strangers, since he already had fangs.

3.3. Experimental set up

Several pilot trials were carried out during three weeks before the study had its beginning, so we could adjust the protocol to have the best setup and materials for the study.

The tests took place in a part of the house arena of the wild boars with 6.96m x 14.24m (Figure 1). The arena was completely outdoor and limited by a non-opaque metal fence all around.

A wooden cage (1.58m x 0.53m) was positioned within the arena (Figure 1- Test Cage) and served as a visual isolation enclosure at the outset of the tests. In front of that, a small fence delineated

the starting point (Figure 1- circle). Positioned over the fencing of the test arena, on both sides, were defined the positions A and B, where the objects/person were placed. These points were situated 7 meters apart from the starting point in a diagonal alignment and 6.96m apart from each other. Encircling points A and B, two red semicircles' lines were painted, marking a distance of 0.60m and 1.20m from the object/person. Position A was always on the left side of the Test Cage and position B on the right.

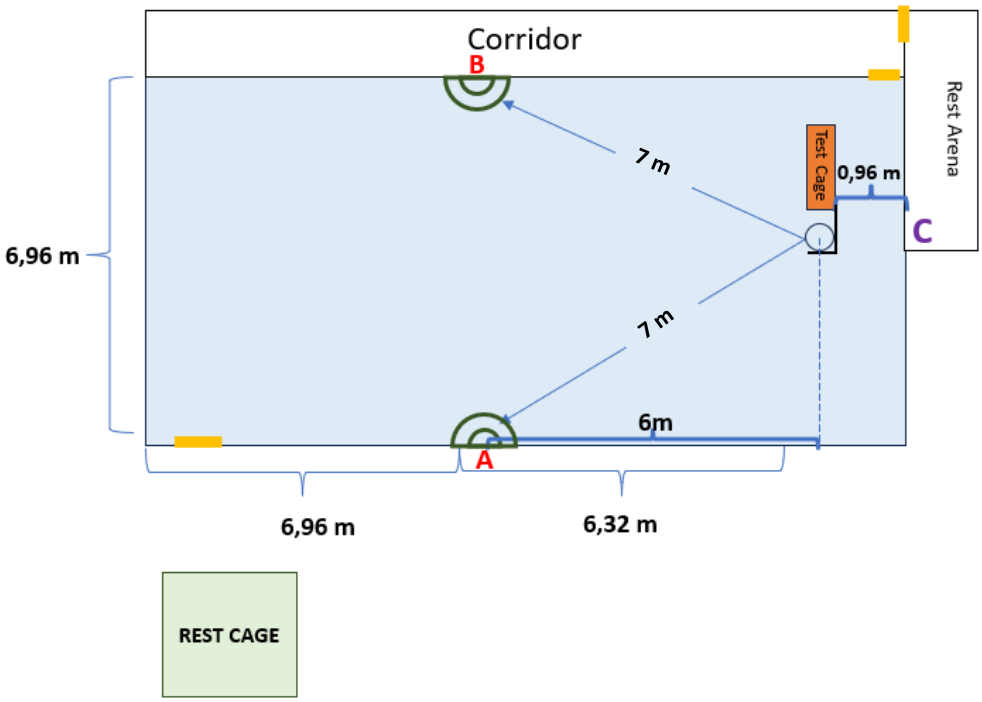

Figure 1. Arena Graphic (Circle – Starting point; Black lines in "⌟" form – small fence; Yellow rectangles – doors; Purple "C" – outdoor camera).

Between test sessions, the wild boars roamed freely and together within the arena, without restrictions. The Test Arena, Rest Arena and Corridor were physically separated by a non-opaque metal fence. Before beginning the tests, the wild boars were initially placed in the Rest Arena to allow the experimenter to set up the arena. Subsequently, each subject was individually relocated from the Rest Arena to the Test Cage, for testing.

All tests were recorded as videos by three cameras: two *Go Pro®HERO8 Black* (placed in the people's chest region or in the fence in the case of the Familiar object) and an outdoor *Sony® 4k FDR-AX53* camera (Figure 1- Purple "C") that recorded the Test Arena during all the tests.

3.3.1. Test 1 – Stranger vs. Familiar Person (FP_S)

The stranger person (referred to as 'S') were volunteers who had never met the animals before but had experience in handling them. To achieve sex matching, as the familiar individuals were females, the volunteer S were five females (each time a different one – five tests). The age of the S was between 24 and 42 years old, with the mean of 32±6.82 years old. The familiar person (referred to as 'FP') was chosen based on being the closest people to the wild boars from their birth and with whom they felt comfortable and used to be stroked and fed. The age of the FP varied between 25 and 37 years old (mean of 31±8.48 years old).

Both the S and FP were dressed alike with a dark blue farm suit and a pair of rubber boots. The interveners used *Go Pro* cameras, each one of these attached to the person's chest region, in a way where it was possible to observe at least 1.20m around each position.

The positioning of each intervener for every trial was counterbalanced. The selection order of participants in this study, both FP and S, was not predetermined; rather, it depended on the availability of the interveners.

3.3.2. Test 2 – Familiar Object vs. Familiar Person (FP_FO)

The familiar object (referred to as 'FO') was a food basket (0.35m x 0.25m), known to the wild boars. During the test, it was always empty of food. The familiar person (referred to as 'FP') wore the same attire as in Test 1.

The position of each object for every trial was counterbalanced to ensure consistency, and the choice of order by the FP was contingent upon their availability. The total number of trials for each test conducted on each subject can be observed in the table below (Table 2).

Table 2. Number of trials per subjects in each test.

Test 1 – Stranger vs. Familiar Person				
ID	**Name**	**Test Name**	**Test Number**	**Number of trials**
I	Pan	FP_S	1	5
II	Stan	FP_S	1	5
V	Gina	FP_S	1	3
Total		**FP_S**	**1**	**13**
Test 2 – Familiar Object vs. Familiar Person				
I	Pan	FP_FO	2	4
II	Stan	FP_FO	2	3/4*
V	Gina	FP_FO	2	2
VI	Tony	FP_FO	2	4
Total		**FP_FO**	**2**	**13**
TOTAL (Test 1 + Test 2)				**26**

*Note: We excluded a sample of Stan (ID=2, FP_FO) in the analysis because the subject spent that trial eating scattered food in the arena, accidentally, which does not have scientific value for this research. Because of this, we analysed 3 trials (and not 4) from Stan (ID=2) in FP_FO.

3.4. Testing procedure

The wild boars were tested in a random order for each test. Each subject was brought to the arena individually, with the assistance of the experimenter, using food rewards and without physical constrains. Upon arrival, the experimenter oriented them to the Test Cage, where they were confined for 3 minutes to eliciting their motivation to explore the arena. During this time, the experimenter remained attentive to any signs of stress exhibit by the wild boar, such as stress vocalizations. If such signs were detected, the experimenter would promptly open the cage and stop the experiment, although this scenario never arose. Positioned above the Test Cage, the experimenter observed the interveners in the preference test quietly entering the arena and occupying their positions (A or B), remaining unseen by the wild boars before the start of the test. The respective positions that were mentioned before the test start by the experimenter. After the 3 minutes of isolation, the cameras started to record, and the experimenter opened the door of the cage, who then closed it after the subject voluntarily left the crate. The subject was then free to move around during the 3 minutes without any restriction (Figure 2). Upon completion of the test, the cameras ceased recording, and the interveners were able to vacate their positions to interact with and feed the tested animal Before initiating the next experiment and to allow an easier change of the piglets, the ones already tested were placed in the Rest Cage.

3.4.1. Test 1 – Stranger vs. Familiar Person (FP_S)

During the tests, both the S and the FP stayed standing quietly and passive, with their hands on their pockets. They were allowed to follow the wild boar with their gaze but not to make any sound or reaction during the experiment.

3.4.2. Test 2 – Familiar Object vs. Familiar Person (FP_FO)

The FP behaved similarly to the description in Test 1. The FO was placed in the respective position (mentioned before the test by the experimenter) by the FP during the wild boar isolation time. After this, the FP occupied the opposite position. The FO was just placed on the ground; therefore, the wild boar was free to approach to it and move it.

Figure 2. Examples of the procedure of FP_S and FP_FO, respectively.

3.5. Ethics statement

The University Institutional Animal Care and Use Committee (UIACUC, Eötvös Loránd University, Hungary) issued its ethical approval of the project under the certificate no. ELTE-AWC-010/2021.

3.6. Behavioural variables

The videos were merged and synchronised using *Adobe Premiere Pro* programme and coded with *Solomon coder* (v. 19.08.02; András Péter http://solomoncoder.com) (Figure 3). In the coding, the experimenter measured the subject's behaviour, choice, and movement during the tests.

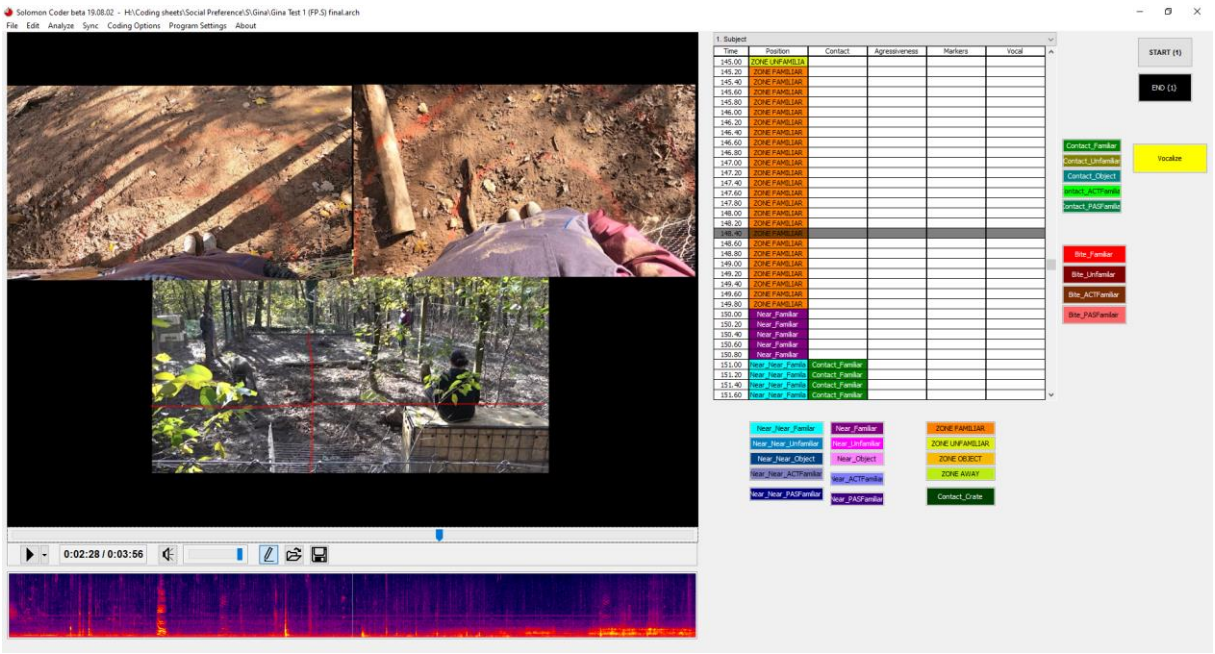

Figure 3. Overview of Solomon coder coding – an example.

During the analysis of the video, the arena was divided in three areas (Figure 4): *Away* (the zone corresponding to the space which was longitudinally behind the starting point, this one included) and two proportional areas, which transversally divided the arena in two from the starting point – *Zone*. The *Zone* was defined as *Zone FP*, *Zone S* or *Zone FO*, dependently of the present intervener in that moment in Test 1 or 2.

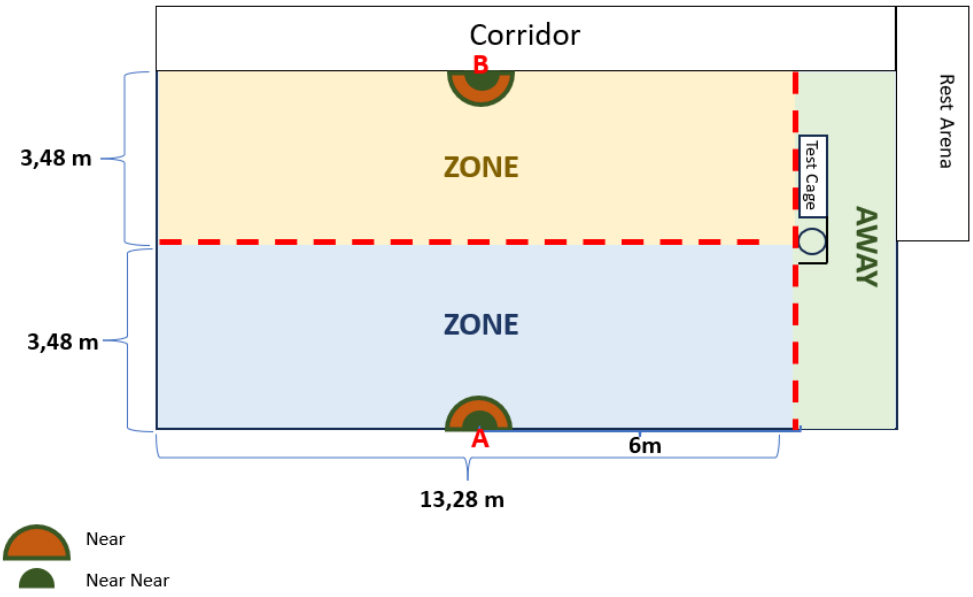

Figure 4. Graphic of the arena with the respective division for coding measure.

We measured the wild boars' behaviour for 180 seconds (s), each was considered from the moment that the subject's body was completely out of the Test Cage. Then, we analysed the following behaviours (Table 3), based on the setup division (Figure 4):

Table 3. Behavioural measures and variables.

Group	Variable	Definition	Type
FP, S and FO	***Near Near***	A distance where at least the head and the front arms of the subject were 0.60m apart of the intervener with or without establishing physical contact.	Duration (s) Latency (s) Frequency (duration/180s)
FP, S and FO	***Near***	A distance where at least the head and the front arms of the subject were 1.20m apart of the intervener with or without establishing physical contact.	Duration (s) Latency (s) Frequency (duration/180s)
FP, S and FO	***Contact***	A distance where any part of the subject body is in contact with any part of intervener body or surface.	Duration (s)
FP, S and FO	***Zone***	A rectangle area of 13.28m x 3.48m which corresponds to a division of the arena into two equal parts from the starting point (Figure 1). The *Zone FP, S or FO* was considered when the subject was, at least, with the head and the front arms inside this area and not *Near Near* or *Near* to the respective intervener.	Duration (s)
	Away	Zone located longitudinally behind the starting point, this one included. The *Away* was considered when the subject was without the head and the front arms in any area mentioned above.	Duration (s)
	First approach the 'targets'	The time taken from the moment the subject is completely out of the Test Cage until the moment it first approaches one of the targets within a radius of 1.20 m.	Latency (s)
	Contact ratio	(*Contact*/*Near*) for each intervener.	Value between 0 and 1 (s)

	Preference index	Time spent in proximity of the FP: For the calculation we considered the time spent in proximity to the FP. Following the method of Gácsi and colleagues (2005), it was calculated as follows: Preference index of *Near* $\frac{Near\ FP\ (\text{total}) - Near\ FO/S\ (\text{total})}{Near\ FP\ (\text{total}) + Near\ FO/S\ (\text{total})}$ Preference index of *Near Near* $\frac{Near\ Near\ FP\ (\text{total}) - Near\ Near\ FO/S\ (\text{total})}{Near\ Near\ FP\ (\text{total}) + Near\ Near\ FO/S\ (\text{total})}$ A value close to zero indicates no preference (in terms of total time spent in proximity), while a value closer to +1 indicates high preference for the FP over S or FO. The value closer to -1 shows the contrary. This variable will be measured two times – one for each experiment (FP_S and FP_FO).	Value between −1 and +1 (s)
		Social Proximity: For this calculation we have in account the variables that shown a social proximity: *Near FP, Near Near FP* – in both conditions (FP_S and FP_FO); and *Near S* and *Near Near S* – in FP_S condition. The set of these variables had the name of *Social Area.* Furthermore, we considered the others (*Away, Zone FP, Zone S* or *FO*'s, *Near FO* and *Near Near FO*) in *No Social Area.* The calculation has made through the ratio of the duration of the subjects in the respective *Areas* (s) *per* Area (m^2), for a fairer comparison between the time on *Social Area* and on *No Social Area*. Areas (values): *Near FP* (or *S*) + *Near Near FP* (or *S*) = 2,36 m^2 *No Social Area* = (99,39 m^2 – *Social Area* (m^2)) Accordingly, the formulas used for Social Proximity was: **FP_S:** $\left[\frac{\frac{Duration\ in\ Near\ and\ Near\ Near\ FP\ and\ S}{2{,}36 * 2}}{\frac{Duration\ in\ No\ Social\ Area}{99{,}39 - (2{,}36 * 2)}}\right]$	

		FP_FO: $\left[\frac{\frac{Duration\ in\ Near\ and\ Near\ Near\ FP}{2{,}36}}{\frac{Duration\ in\ No\ Social\ Area}{99{,}39-2{,}36}}\right)$ A value close to zero indicates no preference (in terms of total time spent in proximity), while a value closer to +1 indicates high preference for the Social Proximity to the FP and/or the S. The value closer to -1 shows a preference of being far of the social interveners (Away, Zone FP/FO/S or close to the FO).	

*Note: The *Near Near, Near, Zone* and *Away* are mutually exclusive measures.

3.6. Statistical analyses

After the experimenter had coded all the videos, a second coder, who was blind to the study's aim, double-coded 20% of them. The inter-rater agreement for 'Position' (towards *Near Near FP/S/FO, Near FP/S/FO, Zone FP/S/FO, Away*) and *Contact* (with FP/S/FO) was calculated using a raw coding sheet, where the occurrence of these behaviours was marked every 0.2s. This analysis indicated good reliability (mean ± SD Cohen's kappa: Position 0.94 ± 0.03; Contact 0.75 ± 0.2) and "Frequency of Position " proved to have a strong Spearman's rank correlation, $r_s = 0.95$, $p < 0.001$).

3.7. Data analysis

The *R statistical environment* (v. 3.5.0. R Development Core Team, 2018) was used for data analysis. The continuous variables did not follow normal distributions, as indicated by Shapiro–Wilk tests. Therefore, we applied Tukey transformations with optimal lambda parameters to fulfil normality criteria, which resulted in normal distributions for all duration variables (*Zone, Near, Near Near and Contact*). Then, we built linear mixed effect models (LMM) for the above-mentioned response variables, including 'Condition' and 'Target' (FP and other: S or FO) as explanatory factors. For frequency variables, we build generalised mixed effect model with Poisson distributions. Likelihood ratio tests (LRT) were conducted to investigate the significance of the explanatory factors in the models. Furthermore, we built Mixed Effect Cox Regression models (coxme function) for the 'Latency to first approach the targets' assessing the effects of 'Condition' and 'Target' as well. We included individual subjects as a random factor in all the models and obtained pairwise post-hoc comparisons for the fixed factors, which we reported only in the presence of interaction of the fixed factors. We reported the results of the final models. To test the divergences from zero of the preference indices, we used one-sample t-tests as our data was normally distributed.

3.8. Limitations

3.8.1. Numbers of subjects

We had a low sample size in our tests, which is the consequence of special conditions of these animals: four socialised and human-hand raised wild boars in the Budakszi Vadaspark, which were rejected by their mothers.

Since wild boars' and participants' wellbeing were always the priority of our tests, we had to exclude Tony (the older male – Table 1) in FP_S, because he had already fangs that could accidently harm the participants.

For these reasons, it was not possible to increase the sample in our tests.

3.8.2. Weather conditions

Tests were conducted between 24th October and 2nd December, a period of time with very high weather and temperature variation (from 16^{o} C to -2^{o}C). Rainy days were always considered, as these can alter the performance of wild boars, making them more energetic and less focused as they receive more scents from the environment. Because of these, none of the tests were made on rainy days. We observed that during drier and warmer periods the animals were more active, and on colder days they were calmer. However, on both situations, they were focused on the tests and showed similar behaviour, therefore, we did not consider this a problem. We chose this period for our tests, since they were not too young to be tested (6-8 months) neither too old that the physical contact with them could be a risk of security and wellbeing for the wild boars and for all the humans that have participated in this study.

3.8.3. Strangers' differences

During the protocol's elaboration, we were concerned about the differences of our five strangers since they naturally had different smells and appearances. To try to mitigate this, the experimenter always gave suits and boots to the S and to the FP in the beginning of the tests. These suits and boots were the same, however, we marked them so that one of the suits was always for the FP and the other for the S. If the S wore glasses, these were always removed during the tests. We did not notice any kind of wild boars' behavioural pattern with the strangers that we could associate with any of their peculiarities.

3.8.4. Set up

3.8.4.1. Experimenter position

The experimenter had to stay above the starting cage (Test Cage - Figure 1) during the tests, since there was no possibility of leaving the arena without disturbing the subject's behaviour and the test itself. For this reason, the experimenter had no food with her, did not move or speak during the tests, so her presence would not be noticed by the wild boars. Since the stimulus in the arena were higher than the presence of the experimenter, the wild boars did not pay attention to her, hence we do not consider that this interfered with their performance.

3.8.4.2. Subjects' visualization among them

During the tests, one wild boar was placed in the Test Arena, while the other three remained in the Rest Arena (Figure 1). However, the Rest Arena was next to the Test Arena, therefore, the wild boars could see and smell each other since these two places were separated physically with a metallic fence. As the wild boars lived together and were used to each other, the wild boar in the Test Arena did not pay attention to the ones at the Rest Arena, and vice-versa.

3.8.4.3. Food in the arena

The wild boars had free access to all the places: Rest Arena, Corridor and Test Arena, during the day, since these three places together were the adequate space for their well-being. Only during the tests, the communication doors between the three places were closed so the tested wild boar stayed only in the Test Arena while the others stayed in the Rest Arena or the Rest Cage (Figure 1).

The diary food was giving by the caregiver by throwing it into the Rest Arena to avoid food at the Test Arena. However, this factor was difficult to control because of two constraints:

1. Wild boars were able to spread the food given into other places. Since they are a forage species, they prefer to scatter the food and feed themselves little by little than to eat all in just one place.
2. The Test Arena was outdoor, so the presence of some plants, seeds, stems or even acorns from the trees and from the ground is uncontrollable.

We were alerted to these constrains, therefore, in the beginning of each test, we removed all the visible food on the Test Arena. Nevertheless, the wild boars are foragers so they can detect small pieces of food scattered around better than us.

We think that the only definitive solution for this concern would be to test them in an indoor environment, however, this could result in fear, stress, and discomfort for the wild boars since they

had to be transported in a cage by car and tested in an unknown and unnatural space for them. Because of this, we decided to plan this study as a passive foraging paradigm and not as an active choice paradigm, where the animals would need to be very focused on us. Futhermore, during the experiments, we controlled the outdoor arena as much as possible.

4. RESULTS

4.1. Time spent in Zone: FP and Other

All the subjects spent more time in the *Zone FP* in the FP_FO than in FP_S (LMM, main effect of 'Condition': T_{21} = -2.270, p = 0.034) (Figure 5). Individuals proved to have great variability in their responses across conditions (Figure 6), which led us to infer that this behaviour was not consistent, at least in the few occasions in which we conducted the test (mean = 28.985 and SD = 28.262) (LMM, model statistics: X^2_3 = 5.937, p = 0.015). An increased sample size would have been needed to further investigate the variability of the subjects' responses.

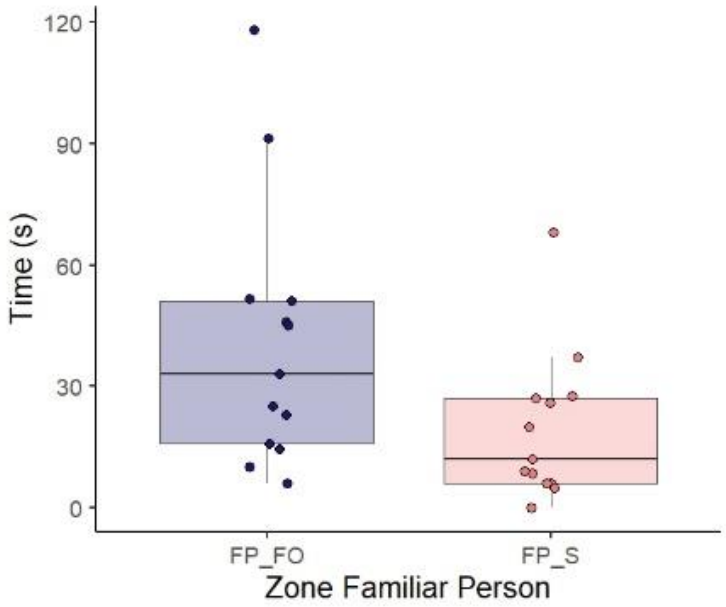

Figure 5. Total time spent in *Zone FP* in the two conditions.

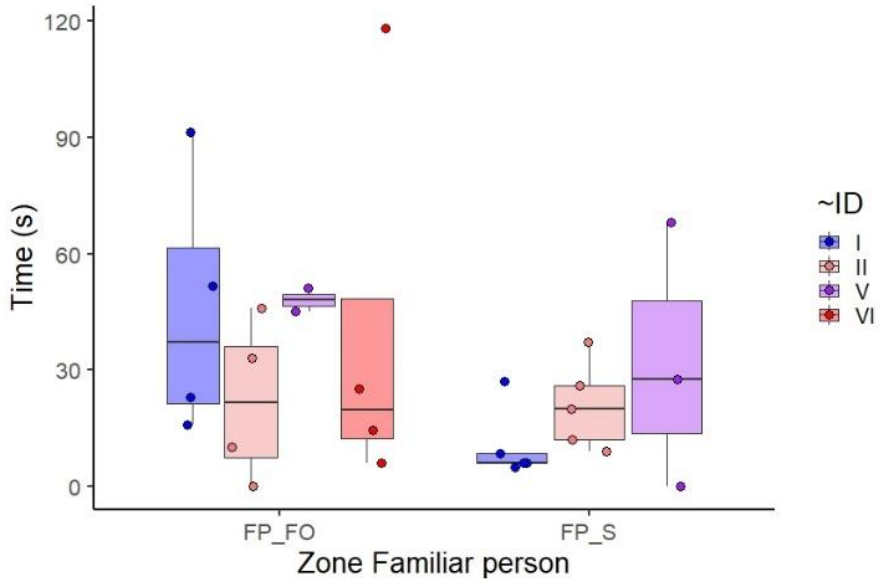

Figure 6. Time spent in *Zone FP* in the two conditions by individual.

To assess the potential effect of target besides condition, we also analysed the time spent in *Zone FP* and *Zone Other*, which corresponds to *Zone S* in FP_S and *Zone FO* in FP_FO. Following these analyses, we found an interaction effect between target and condition (LMM, model statistics: X^2_3 = 8.279, p = 0.004). *Post-hoc* comparisons revealed that wild boars stayed in *Zone FP* more time in FP_FO than in FP_S (p = 0.042) (Figure 7).

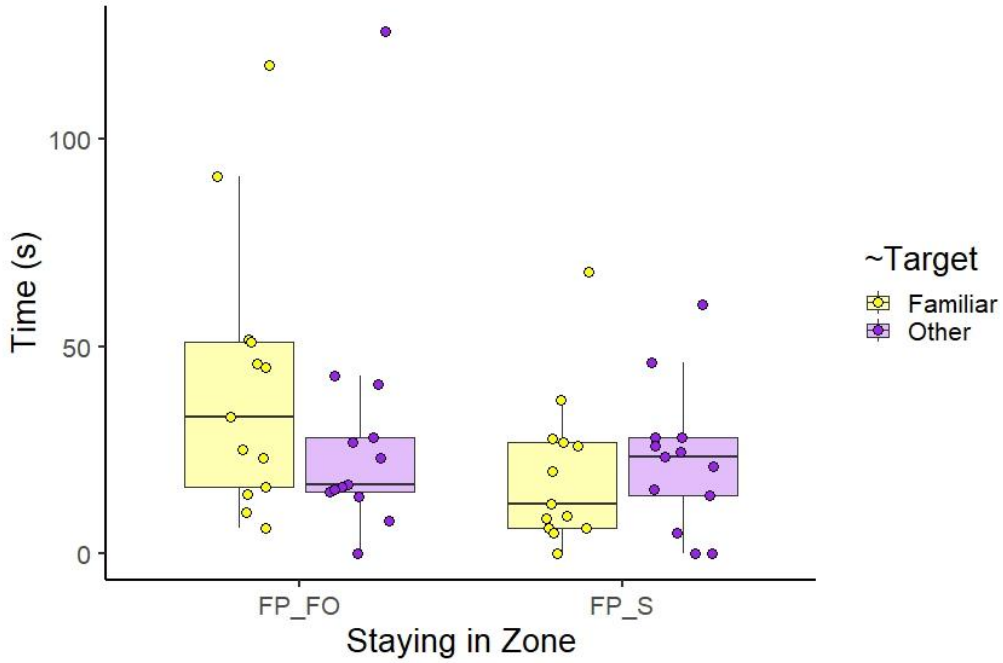

Figure 7. Total time spent in *Zone FP* and *Zone Other* (S or FO).

4.2. Time spent *Away*

Although the effect of the condition of the time spent *Away* was not significant (LMM, main effect of 'Condition': $T_{21} = 1.28$, $p = 0.15$), the model including the condition has a better fit (LMM, model statistics: $X^2_3 = 9.545$, $p = 0.002$). Consequently, we reported this tendency in the data and speculated that with more statistical power these results could become significant. In summary, subjects might spend more time *Away* in FP_S than in FP_FO (Figure 8).

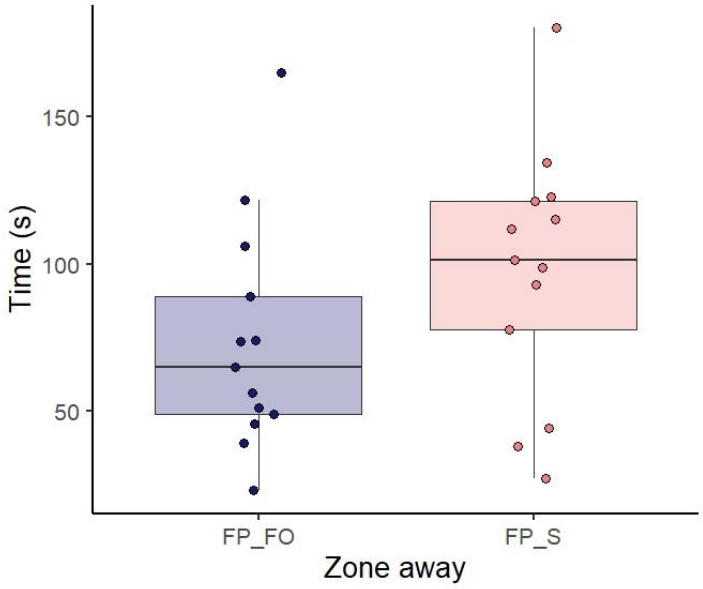

Figure 8. Total time spent in *Away* zone in both conditions.

4.3. Time spent *Near Near FP*

The effect of the condition of the time spent *Near Near FP* was not significant (LMM, main effect of 'Condition': $T_{21} = 1.18$, $p = 0.25$). However, the model including the condition has a better fit (LMM, model statistics: $X^2_3 = 2.930$, $p = 0.087$) and, because of this tendency, we speculate again that with more statistical power these results could become significant. In Figure 9, it can be demonstrated that the subjects spend more time *Near Near FP* in FP_S than in FP_FO.

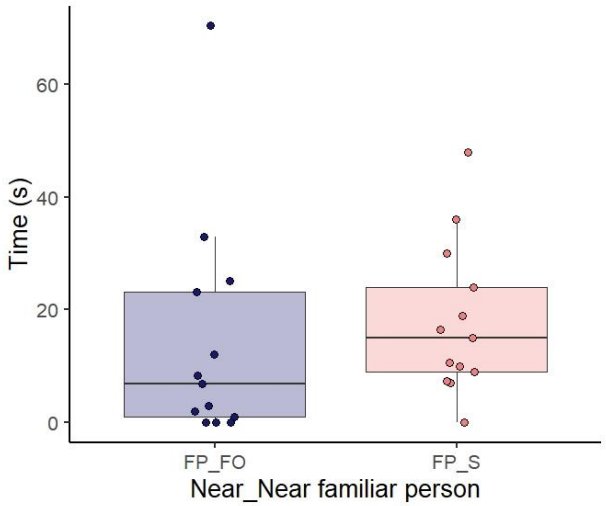

Figure 9. Total time spent on *Near Near FP* on both conditions.

4.4. Frequency and Time spent *Near FP*

None of these results rendered any significance.

4.5. Time spent in *Contact*: FP and Other

Despite of the not significant effect of the condition of the time spent in *Contact*, (LMM, main effect of 'Condition': $T_{21} = 0.82$, $p = 0.41$), the model including the condition has a better fit (LMM, model statistics: $X^2_3 = 18.48$, $p = 0.00002$). Consequently, to the observed tendency, we speculate that with more statistical power these results could become significant. The Figure 10 indicates that there is no significant difference between the time spent in *Contact FP* and *Contact Other*.

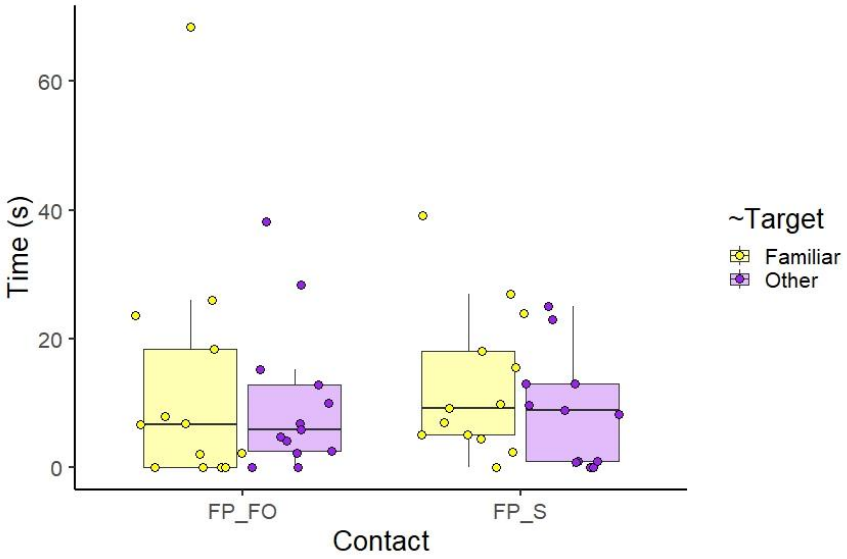

Figure 10. Total time spent in *Contact FP* and *Contact Other* in FP_S and FP_FO.

4.6. Latency and Frequency of First Approach

Wild boars approach faster to the FP than to the other choices (S or FO) (Cox, β ± SE = -0.90±0.44, p = 0.03541) (Figure 11). Moreover, the percentage of frequency of the 'first approach' to the FP was more than 50% in both conditions (FP_S – 69.23%; FP_FO – 53.85%) (Table 4), therefore, wild boars approach the FP first than the other choices in most of the tests.

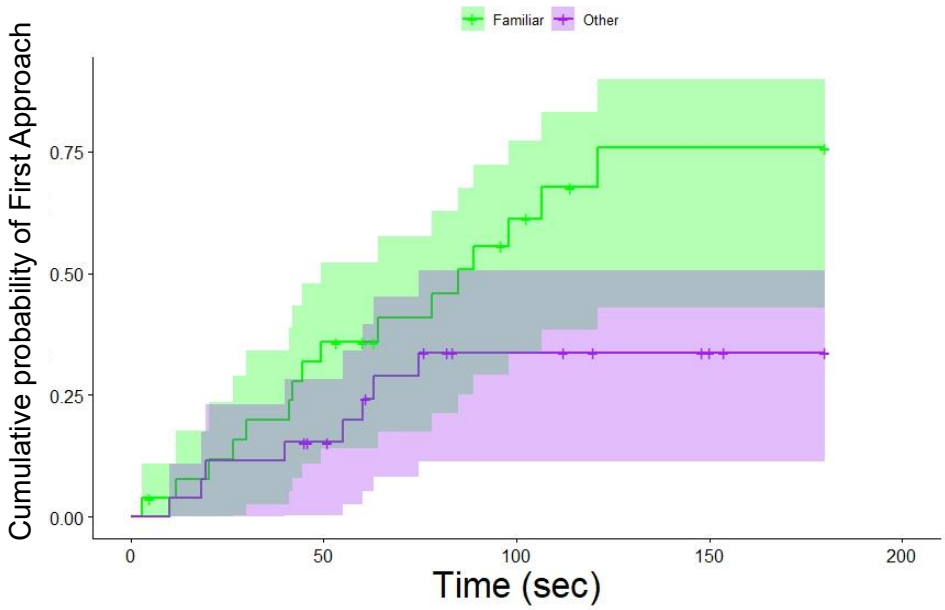

Figure 11. Cumulative probability of time until the First Approach to FP vs. Other (FO or S).

Table 4. Latency, Frequency and Frequency Percentage on First Approach to FP, S, FO and No Approach in FP_S and FP_FO.

	First Approach	*Latency Mean (s)*	*Frequency*	*Frequency Percentage*
Test 1 FP_S	Familiar Person	59.80	9/13	69.23%
	Stranger	84.78	3/13	23.08%
	No approach		1/13	7.69%
Test 2 FP_FO	Familiar Person	83.75	7/13	53.85%
	Familiar Object	89.65	5/13	38.46%
	No Approach		1/13	7.69%

4.7. Preference index: *Near, Near Near* and Social Proximity

The preference index of *Near Near* was significant and *Near* had a tendency of being significant, differing both from zero, regarding FP_S (LMM, main effect of 'Condition', T_{12} = 2.289, p = 0.041 and T_{12} = 1.859, p = 0.088, respectively). However, the animals did not show any preference of *Near* neither *Near Near* in FP_FO (LMM, main effect of 'Condition', T_{12} = 1.402, p = 0.186 and T_{12} = 0.576, p = 0.575,

respectively) (Figure 12). Therefore, wild boars prefer to be next to the FP rather than the S but have no preference for the FP over the FO.

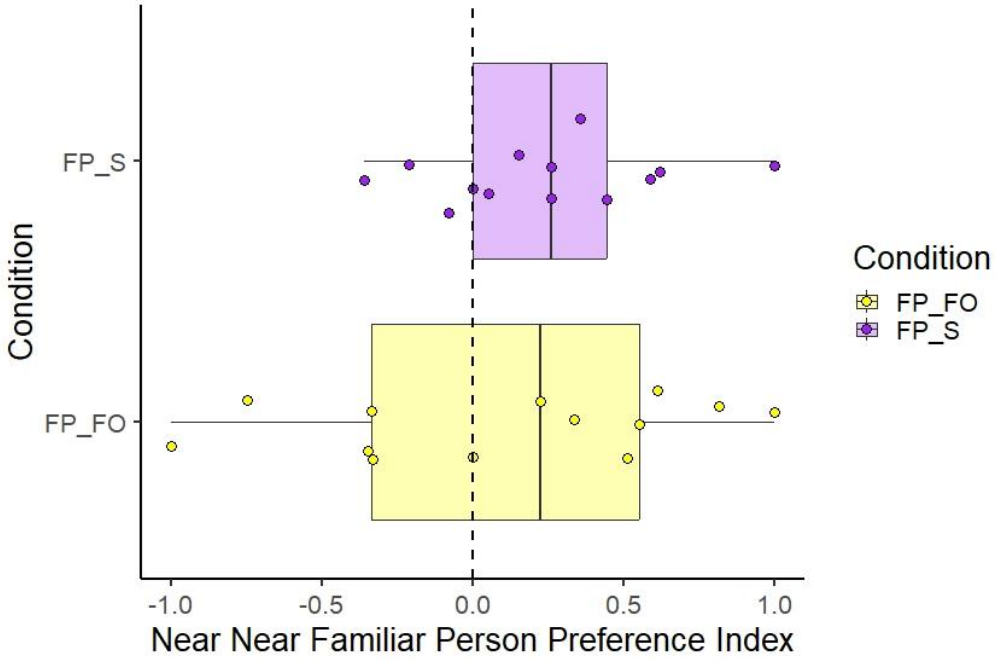

Figure 12. Preference index of *Near Near FP* in FP_S and FP_FO.

Regarding the Social Proximity, in both conditions, the wild boars prefer to be in *Social Area* rather than in *No Social Area* as the results are different from zero (> 0) (LMM, main effect of 'FP_FO', $T_{12} = 5.26$, $p = 0.0002$) (LMM, main effect of 'FP_S', $T_{12} = 6.66$, $p = 2.31 * 10^{-5}$) (Figure 13).

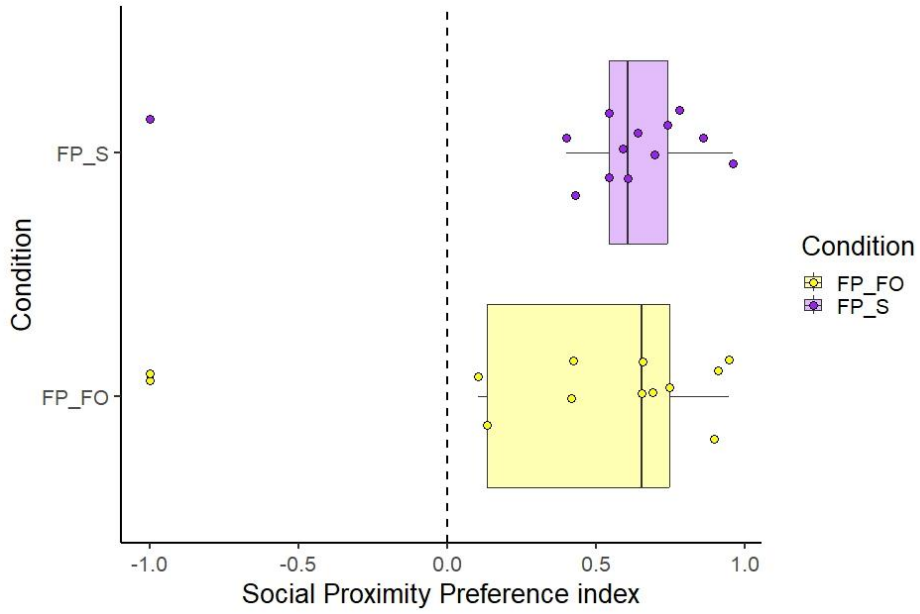

Figure 13. Preference index of Social Proximity in FP_S and FP_FO.

5. DISCUSSION

To date, this is the first report comparing the preference of human-hand raised and socialised wild boars towards a Familiar Person (FP) over a Stranger (S) and a Familiar Object (FO). Our study revealed that wild boars approach first and faster a FP than a FO or a S and they spend more time in the *Zone FP* in the presence of a FO than with a S. Furthermore, based on the preference index results, wild boars prefer to be next to the FP rather than the S and they do not prefer to be next to the FP over the FO. Wild boars also show a preference of being in the *Social Area* (close to the FP and/or S) rather than being in the *No Social Area*. However, there is no significant difference between the time spent in contact with FP and with the other choices. Moreover, the wild boars had also a tendency of being more time *Near Near FP* as well as spending more time *Away* with a presence of a S than with a FO. Together, these results suggest that intensive socialised and hand-raised wild boars can discriminate between familiar and unfamiliar humans and might prefer to forage in their proximity, which is in line with the hypothesis 1. Our findings show evidence that domestication is not a needed factor for social mammals to discriminate familiar humans and show preference for them over non-familiar ones.

As found in the current study, wild boars spent more time in the *Zone FP* in the Test 2 (FP_FO) than in the Test 1 (FP_S). It is important to remark that this variable *Zone* does not take into account the time they expend *Near* or *Near Near,* therefore, this does not mean that the wild boars discriminate or prefer the FP. Similar as in previous studies with other social animals, as pigs and wolves, the subjects might have been more attracted by the proximity of a human than to a static object (Pérez Fraga, 2023; Topál et al., 2005). Moreover, wild boars could associate food with the human presence as well as with the FO (although, there was no food in either of these options). Nevertheless, as they forage more around the FP than the FO, this may indicate that they anticipate more food or more positive events near the familiar person, thus it might be more advantageous for them to forage in their proximity.

Furthermore, we speculate that the animals might spend more time *Away* in the FP_S than in the FP_FO. This behaviour was also noticed in domestic pigs, where it was reported the possibility of pigs having a general motivation to explore the stranger, however, when confronted with them, the novel social stimulus might evoke some fearfulness, which is manifested in a general social stimulus-avoidance behaviour response (Pérez Fraga, 2023). A similar response can occur in the wild boars, and the presence of the S could elicit an approach-avoidance response, so they explore the S and then opt to go away from the potential scary stimulus and try to find food or other interactive choice near their home, which was next to *Away*. Despite the approach-avoidance response, the stranger might have caused them a mild stress, as the wild boars did not display signals of any extreme behaviour during the FP_S, such as freezing, aggression or fear. Moreover, they tend to spend more time *Near Near FP* in FP_S than in FP_FO. We speculate the correlation between the FP's presence with a calmer state in

wild boars, a presence of a S with an approach-avoidance response, and a presence of a FO with a no-stimulus.

Regarding the first approach and its latency, wild boars approach first and faster the FP in both conditions. This indicates that there is the capability of discrimination for a familiar human over the other choices. Furthermore, this can also show the preference of getting closer first to the FP, as she/he can be associated with positive events, like food and cuddling, as well as a secure and previsible relationship.

According to the results of preference index, wild boars prefer to spend more time *Near Near* FP than the S and they also tend to prefer to be more time *Near* FP than the S. Similar to wolves, if intensively socialised with humans since puppies, wild boars also show a preference for a familiar human over a stranger (Range & Virányi, 2013; Virányi et al., 2008). In contrast, dogs seem to show quick generalisation towards other humans, even strangers, as they are more human-oriented (Gácsi et al., 2005; Topál et al., 2005). This characteristic of dogs may be the basis for forming attachment bonds with humans, which is not the case in other species (Gácsi et al., 2005; Pérez Fraga, 2023; Pérez Fraga et al., 2020; Topál et al., 2005). Also, pigs show this human's generalised response according to their past experiences (Brajon et al., 2015). However, this is not happening in wild animals. We speculate that wild boars have tried to interact more with the FP as they are used to being cuddled and fed by them. Despite the exploratory behaviour with S, we suggest that the approach avoidance-response in wild boars leads to a faster move away from the S.

Still regarding social preference, wild boars do not prefer to be next to the FP over the FO. In the previous results, we suggest that wild boars might have been more attracted by the proximity of a familiar human than to a static object. However, we speculate that when wild boars realise that the person does not interact with them, they do not stay *Near* or *Near Near* to the familiar person, but start foraging around his/her, as they associate the familiar person's presence with food.

Lastly, the result of the preference index, concerning the 'Social Proximity', indicates that wild boars prefer the social company, in other words, close to the FP and S in FP_S (*Near* and *Near Near*) and to the FP in FP_FO (*Near* and *Near Near*). Because of this, wild boars search to interact more with both humans (FP and S). This result is in line with the previous results, reinforcing the wild boar's preference for foraging close to the social interveners as well as exploring and interacting with them, and remarking the social nature of this species. Even though the stranger might provoke an approach-avoidance response, we suggest that intense human socialisation let wild boars to want to explore the stranger and associate humans, at certain extent, with positive events, such as food and cuddles.

To sum up, it is necessary to refer that we consider this as preliminary results. The dataset used is small to get strong results, therefore, it is not possible for us to generalise them. However, we can clearly see a tendency in our results in the FP's preference and discrimination. For a more statistical

power and more significant effects, it is necessary to increase the sample size in the number of subjects or trials.

6. CONCLUSION

Altogether, we found wild boars a suitable model for understanding social preference and discrimination over a familiar human in a non-domestic animal. However, due to the small dataset, we should be cautious in generalising our results. Nevertheless, the current data showed a clear tendency of preference for the FP over a S or a FO, as well as the capability of FP's discrimination.

We hope that our findings can contribute to arouse the interest on researching with this species, as well as being a first step for future research in the social preference area with human-hand raised socialised non-domestic animals.

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Social Preference of Human-hand raised and Socialised Wild Boars

Preferência Social em Javalis Socializados e Criados pelo Homem

Catarina de Oliveira

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