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**Ownership: How people perceive something as “theirs.”
Definition and contribution to its measurement**

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Abstract

Psychological Ownership (PO) has often been overlooked by researchers, even though intuitions regarding property are quite common in everyday life. This thesis discusses how the concept of ownership could be defined from the perspective of four different subjects (psychology, law, anthropology and economics), including how it arises psychologically and why. A hypothesis and relevant evidence regarding PO as a moral foundation within the framework of the Moral Foundations Theory will be offered. Then, a study investigating the relationship between PO and demographic variables is discussed. The study represents a contribution and a first approach to the quantitative measurement of PO. Limitations and suggested future studies are discussed.

Keywords: Psychological Ownership, Demographic variable, Perception, Measurement

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Introduction

Morality is defined in the APA dictionary as “a system of beliefs or set of values relating to right conduct, against which behaviour is judged to be acceptable or unacceptable” (APA Dictionary, 2018). Key to every culture are moral judgements: a popular example are the major dilemmas expressed in the Bible regarding what is good and what is bad, and the relative punishment associated with breaking those norms.

In the field of moral psychology, the concept of psychological ownership has been often overlooked by researchers, even though moral judgements about property are common. Ownership intuitions seem to be ubiquitous throughout humanity, with very strong similarities even between different cultures (Rudmin, 1994). Archaeologists report that in Ancient Mesopotamia people used a token-based system to store economic and possession data before the emergence of writing. Seeing a physical representation of a quantity apparently made easier to really understand it immediately. From this type of data, the concept of ownership seems to be at least 6000 years old (Schmandt-Besserat, 1986).

The study of ownership is pivotal in understanding how people think about property, and its significance spans from the individual level to the societal level; in fact, laws are often reformed and questioned based on moral reasoning. Ownership seems also to be represented both in physical and abstract manner by people, an example being ownership laws about intellectual property or moral judgement concerning property of cultural rituals. Some scholars even concluded that ownership “is a distinct domain of reasoning” (Nancekivell et al., 2019). There is strong evidence of ownership intuitions being present across all human cultures (Ellis, 1985), linguistic possessives existing in every language (Langacker, 1995), and ownership or privatization behaviours appearing in many other species as well (Strassman and Queller, 2014).

This work is meant to be a review of what research has discovered about the construct of ownership. The section will review how ownership could be defined from the perspective of four different subjects (psychology, law, anthropology, and economics) to understand how those perspectives overlap and how they give us insights about the meaning of this construct. Societies create laws to determine who owns what and under what conditions. Nevertheless, people act based on their perception of the laws rather than the laws themselves and their perception changes between cultures. Finally, how we think about property influences how financial decisions. This is why studying the definition of Ownership between these subjects is of fundamental importance to progress the study property perception.

Psychological Ownership – Definition

Ownership has been defined psychologically by Pierce et al. (2003) as the state in which individuals feel as though the target of ownership or a piece of that target is “theirs”. Ownership differs from possession in the sense that possession is describing the relation existing between someone and a resource, while ownership “describes a relationship between individuals with regard to a resource” (Hare et al. 2016). In this regard, it might be argued that possession has to do with some physical or contextual aspects of the relationship between someone and a resource. Mere possession can be achieved by invading someone else’s place or by stealing an item. Ownership instead has to do with the intersubjective agreement about possession present between individuals related to a resource, and their willingness in respecting the possession of the resource. Someone can steal an item and “possess” it, but it is unlikely that other individuals will recognize the item as “owned” by the thief.

Following this separation between the concepts of ownership and possession, Hare et al. (2016) state that when intruders do not respect this intersubjective agreement, it is no longer possible to talk about ownership because the intersubjective agreement between individuals is contested. They state that “all-out scramble or frequent aggressive defence against intruders is therefore evidence of the absence of ownership”. In this view, ownership could potentially emerge in every situation where there is competition for resources, making the concept of Ownership almost omnipresent in every society.

PO – Evolutionary Perspective

To understand why humans (and animals, see Strassman and Queller, 2014) may have developed intuitions of ownership, we need to understand first PO through the lens of evolution. It has been stated in the introduction that PO has an intrinsically intersubjective nature, meaning that it refers to the often-implicit agreement between two or more agents over the possession of a resource. PO, in fact, falls into the category of those behaviours that are meant to enhance cooperation over resources. The Bourgeois evolutionary strategy is an increasing-fitness behaviour, describing an ideal equilibrium where the owner defends his/her possessions and the intruder retreats when challenged (Takeuchi, 2017). This equilibrium is highly effective because it allows agents to cooperate with each other through the intersubjective agreement that ownership will be respected and conflicts avoided. The Bourgeois strategy model is still probably the most common framework to think about PO, even though alternatives are emerging. An example of this, tested by Hare et al. (2016), is the Restraint With Retaliation model, which states that an intruder will likely respect ownership (as mentioned in the paper, respect for ownership and the Bourgeois strategy is observed even without third party regulations and common across species) and retaliate only when unfairly treated. The model highlights how PO could be very effective at maintaining cooperative behaviour and being a form of deterrence when the intersubjective agreement is contested. The authors report other examples of the effectiveness of PO in avoiding conflicts. Interesting examples are the Winner and Loser effects (Morrell and Kokko, 2003), or the peaceful and stable territorial divisions observed by Pereira et al. (2003), or the Dear Enemy Effect, where neighbours respect each other's territories and property, and conflicts are avoided "because mutually respected boundaries reduce the energetic costs associated with territorial maintenance" (Hare et al., 2016). In conclusion, PO seems to have evolved because it favours cooperation over competition through multiple routes, leading to an increased individual and group fitness.

How PO arises - Psychological cues

Even though the evolutionary benefits of PO are evident, understanding how it arises psychologically is harder. How can people guess someone's ownership without even communicate verbally? In this paragraph, two influential perspectives are discussed.

Many authors tried to investigate how the perception of Ownership arises. Jean-Paul Sartre, in his “Being and Nothingness: A Phenomenological Essay on Ontology” (2019), first identified three factors that influence how much people feel something as theirs: perceived control, self-investment, and intimate knowledge (Pierce et al., 2003).

Perceived control

There is convincing evidence that perception of control plays a significant role in increasing feelings of Ownership. Peck and Shu (2009) demonstrated how the mere fact that touching or even an “imagery encouraging touch” increase feelings of ownership. Atasoy and Morewedge (2018) found consistent results when they discovered that digital goods are often valued less than physical ones due to a weaker feeling of ownership towards them. The same authors found that rented objects too are linked to a weaker feeling of ownership compared to owned objects. The explanation seems to be the reduced perception of control due to the intrinsic conditions (renting or digital) through which people interact with objects.

Self-investment

The idea that investing resources in something leads to feel a heightened sense of ownership is not recent. In fact, John Locke, in his *Two treatises of government* (1689), first explored this idea. This phenomenon is nowadays referred to as the “IKEA effect”. People seem to think about object’s value in a disproportionate way when they have created or partially created the object, even though it is not legally theirs (Norton et al., 2012). Bagga et al. (2019) found that feelings of psychological ownership and perceived value of things go up as the economic investment increases.

Self-investment also appears to play a role in Leon Festinger's Cognitive Dissonance Theory, where he demonstrated how people who invested a lot of time, resources and dedication to their cults and to be part of them tend to paradoxically increase their commitment to the cult after prophecy failure, likely indicating feelings of ownership towards the cult (Festinger et al., 1956). The same process seems to happen in romantic abusive relationships as well. Collins (2011) and Edwards et al., (2010) showed that, in abusive relationships, women's higher commitment levels were associated with an increased likelihood of remaining in those relationships. Evidence suggests that self-investment, expressed in different forms and degrees like emotional attachment or money, is a pivotal factor in understanding complex situations as ownership, cult adherence and romantic relationships and in understanding why people sometimes appear attached to objects, ideas or institutions in ways that are often irrational or disproportionate. Humans appear to feel ownership when they invest resources on someone or something.

Intimate knowledge or Self-object congruity

Intimate knowledge refers to the relationship people establish with objects. This concept is very controversial and additional efforts in the definition coupled with more experimental studies are needed (Morewedge, 2021). Morewedge suggests that self-object congruity "is more likely to be a unique antecedent of psychological ownership than intimate knowledge". Self-object congruity refers to the degree of alignment between a person's self-image (how they view themselves) and the attributes of an object, like a product, brand, or even another individual. When there is a strong match between the two, individuals tend to have a more favourable attitude toward the object and are more likely to engage with or choose it (Sirgy et al., 2016). Morewedge also states that "there is more empirical support for self-object congruity facilitating psychological ownership than for intimate knowledge facilitating psychological ownership" (Morewedge, 2021).

Other cues – Boyer’s model

Other researchers have identified additional cues that appear to be used by people in drawing ownership judgements, on an explicit and implicit level. Boyer (2022), in his model, suggest other four cues: contiguity, interaction, defence and modification of things.

1) Contiguity

People seem to infer that agent A owns object B when they are seen together multiple times. This is referred to as “contiguity”. Humans appear very good at noticing cues that could unveil ownership of items. This ability represents a big evolutionary advantage because, if people recognize and respect other’s possessions, conflicts about goods and land tend to diminish and cooperation is heightened (Hare et al., 2016). Based on this assumption, Scorolli et al. (2017) tested the hypothesis that tracking object ownership can be influenced by any cue that predicts the establishment of individual physical control over object. The researchers focused on spatial proximity, touch and temporal priority cues. The results were consistent with the hypothesis that people use a different and diverse array of cues related to physical control to ascribe ownership. The authors report touch to be a stronger cue for the ascription of ownership than temporal priority.

2) Interaction

The second cue identified by Boyer is interaction. The author states that when people see an agent and an object interacting, intuitions of ownership are highly likely to be generated. Contiguity appears to be a precursor of interaction, as it is usually very rare that an agent is seen multiple times with an object without interacting with it.

3) Defence

The third cue is defence. From an evolutionary standpoint, it makes sense that once agents create, buy or conquer a possession, they strive to keep it. It should be noted that the concept and phenomenon of defence makes sense only if an agent attempts to seize a resource. Sherratt and Mesterton-Gibbons (2016) state that current owners are typically advantaged when fighting intruders over a resource conflict.

Apparently, respect for ownership is intuitively more likely to arise when owners are more likely to win fights than intruders, leading to a reinforced Bourgeois equilibrium where owners defend their possessions and intruders respect other's ownership. They argue that this is due to two main factors: a self-sorting mechanism, where stronger individuals usually become owners, and weaker individuals end up leaving the resource; and the intrinsic characteristics of the resource, where features of the resource favour the owner over the intruder over possession, as familiarity or other physical aspects of the resource.

4) Modification to the thing

The fourth cue is modification to the thing. Humans and animals modify the items they possess for multiple reasons. While animals modify possessions (and even partners) to privatize or defend them, humans personalize objects also to make them more like their personality. This often leads to an enhanced self-object congruity, as we mentioned before, but not only. Previous research has demonstrated that objects are used not only for their practical purpose but also as status signals and to express the self and group identities (Strassmann and Queller, 2014; Wheeler and Bechler, 2021).

Boyer (2022) in his model argues that these cues are used by humans as indices and signals to other humans to understand each other's property. As expressed by Boyer: "Those cues are *indices* of relations between agent and thing. Many such cues are also *signals*, that is, they occur precisely because of their effect on the receiver" (p. 4).

Overlapping cues: towards a unified model

It is worth noting that there is significant overlap between the cues identified by Sartre and the ones identified by Boyer. For instance, perceived control shows many similarities with the cue of contiguity, as contiguity probably underlies control; after all it makes sense that an agent that is often seen with an object not only is physically or temporally close to the object, but that he or she controls it. Self-investment is linked with the cues of interaction and modification to the thing. To modify something, you must invest time or resources in it, as you do when you interact with the object or when you use it. Investing time and effort in something usually leads to intimate knowledge (Pierce et al., 2003). The overlap between models is a good indicator that researchers

have been looking in the right place as it logically is a good measure of reliability. Future research should investigate better how these cues interact with each other. Exploratory Factor Analysis would be a good line of research to unveil whether these cues are all different from each other or whether some of them underlie the same construct instead. As stated by Pierce and al. (2003) referring to the cues Sartre identified (see paragraph “How PO arises – Psychological Cues):

“We suggest that the three routes to psychological ownership (i.e., control, intimate knowing, and investment of self) are distinct, complementary, and additive in nature. Any single route can result in feelings of ownership independent of the others. However, the feelings of ownership for a particular target will be stronger when an individual arrives at this state as a result of traveling multiple routes (e.g., intimate knowing and controlling) rather than just one route” (p. 95).

Ownership – Anthropological definition

Anthropological research has given many insights about how constructs and ideas change between cultures. A well-known example is Henrich et al. (2010), where researchers stated that many breakthrough discoveries about the mind could not be considered universally valid (meaning in every culture) because around 95% of the experimental subjects in psychological studies are from western cultures, and mainly university students. This explains why some findings are replicated in some cultures and not in some others: samples are hardly able to include all the variation in human behaviour, from here the author's alarm to diversify sample in psychological studies. How can anthropology help in understanding the variation in ownership intuitions and behaviours between human cultures? This chapter will outline some insightful articles regarding the impact of culture on PO and the need for more research outside the Western world.

Many of the cultural differences discussed here arise reflecting the well-known split between individualism and collectivism. Western societies are likely more prone to phenomena such as the Endowment effect or contagion due to their heightened focus on the individual rather than interdependence (Apicella et al., 2014; Gjersoe et al., 2014). Anthropologists have often described differences in ownership behaviours between populations resulting from dissimilar ideas of property. As explained by Brightman et al. (2018) in his book *Ownership and nurture*, ownership is often described in terms of symbolic and social possession rather than rights and private property. It is very usual in non-WEIRD¹ countries to share ownership of resources between people, where the deterrent power that guarantees ownership agreements is held by religion, reputation and other social mechanisms (Harari, 2024; Henrich, 2009) (nowadays, in the West, institutions and laws appear to have taken the place religion and social mechanisms once occupied. For a comprehensive account, see *Big Gods* by Norenzayan, 2015). For instance, the ownership conceptualization is often linked with ideas of purity, ancestry, and status (Thorat and Sadana, 2009).

¹ WEIRD: Acronym for “Western, Educated, Industrialised, Rich and Democratic. The term appeared for the first time in Henrich et al. (2010) “The Weirdest People in the World”.

Few studies have looked at the variation in ownership intuitions between populations. Rochat et al. (2014) compared children of different age, cultures and socio-economic status in their way of reasoning about ownership through a series of script where subjects were asked to decide who was the owner in multiple conditions. The results indicated that culture and contextual variables like socio-economic status (SES) heavily influence children's intuitions of ownership. An example are the Chinese preschoolers in the study: they showed significantly more willingness, compared to the other cultures, to split the contended object in halves whenever it was possible. The authors attribute this behaviour to the way Chinese children are raised in school. The children from the poorest cultures (Recife in Brazil and Vanuatu) instead showed the lowest propensity to split. Researchers affirm that the reason is the way local children are taught to respect adult's authority. Apparently, it is disrespectful to transform an adult's object, especially in front of someone watching; this likely explained children's lower willingness to split in front of adults and researchers even when it was possible to.

Other efforts have been conducted to highlight differences in ownership intuitions between individualistic and collectivistic societies. This type of research, as predicted by Heinrich et al. (2010), revealed that many perceptions are more common in WEIRD societies compared to others. Apicella et al. (2014) found the Endowment effect to be absent in the Hazda hunter-gatherer population living in isolate regions. When researchers evaluated Hadza people living closer to modern society, they found the Endowment effect to be present. Authors offer numerous explanations, among which: "While the standard explanation for the endowment effect is that it is a manifestation of loss aversion (Kahneman and Tversky, 1979) other explanations have been offered. Most recently, it has been suggested that the endowment effect results from the reluctance to trade on unfavourable terms with respect to reference prices (Weaver and Frederick, 2012). This explanation requires that, for individuals to have an endowment effect, they must first have notions of reference prices or exchange rates, which come from market experience" (Apicella et al., 2014). Since Hadza people living in isolated regions have no such experience, they apparently do not display the Endowment effect. Another explanation is that the hunter-gatherer lifestyle actively suppresses the effect for survival purposes. Even though more research is needed, evidence suggests that culture plays a big role in

influencing ownership intuitions and economic choices. These findings indicate that this specific phenomenon is not a human universal.

Another irrational ownership behaviour that displays cultural variation is overvaluing celebrities' possessions. It is not unusual to see people being interested in and fascinated by objects once owned by celebrities. One of the many likely explanations to this behaviour is the concept of *contagion*. Contagion is "the belief that a person's immaterial qualities or "essence" can be transferred to an object through physical contact" (Newman et al., 2011, p. 216). The effect seems to be pervasive in many cultures and developing early (Kalish, 1996). However, Gjersoe et al. (2014) identified differences between cultures (US and India in this case) in the way people value original and authentic objects versus copies that show no differences. Samples have found to be similar in the way they perceive originals, but they differ in the value assigned to celebrities' objects. The explanation offered by the authors relies in the individualistic nature of the American society. Valuing uniqueness and individualism more than collectivism leads to a more positive perception of an object if that object has been owned by a unique and popular individual. However, many factors influence this phenomenon and more research is needed. A more nuanced approach is likely needed, as, even though Indians do not value celebrities' possessions as much as Americans, they display "essentialist contagion in their rituals and concerns about moral contamination (the caste system being the notable example) but essentialist concerns are primarily heightened for negative contamination as opposed to positive transfer, which is what is believed to be operating in celebrity clothing." (Hood, 2014).

As expected, differences can be also observed in languages, as showed by Rudmin (1994) in a psycholinguistic comparison between Cree and English speakers. Even though vocabularies are fairly similar, Cree's conceptualization of the word *own* tends to focus more on wanting, needing and deserving, while English speakers give more importance to the right of possession.

In conclusion, ownership behaviours and intuitions appear to be universal but heavily influenced by culture. More anthropological research with non-WEIRD samples investigating how property is viewed and treated is needed.

Ownership – Legal definition

Since law and its fulfilment determine access and utilization to many items, services and ideas, it is very likely that legal ownership is a pivotal factor in creating and maintaining psychological ownership (PO). As stated by Pierce et al. (2003) in their paper, “legal ownership may facilitate and speed up the emergence of psychological ownership, because it allows the individual to explore the three routes leading to this state. Legal ownership provides the right to control or change the target more or less at one's own will, the right to explore and to come to intimately know the target, and the right to invest the self in the target” (p. 96). As we can see, legal ownership (LO) greatly contributes to the emergence of PO by allowing all the routes indicated by Sartre. LO appears to yield all the four cues indicated by Boyer (2022) too (see paragraph “Other cues – Boyer’s model”). A legal owner of an item is likely to be seen multiple times with the item itself and he or she is likely to interact with it (contiguity and interaction); LO often allows or protects the owner in case he or she defends the owned item against intruders or thieves (defence); and finally, LO allows the owner to legally modify the item (modification to the item). Individuals with no LO over an item are hindered over its access and utilization due to many obstacles and to the institutions made for the purpose of applying the laws, and this likely reduces intuitions about ownership due to the nature of the mechanisms through which PO emerges. For instance, such individuals would likely be separated from the item (the owner defends his/her property) or they would be fearing severe consequences.

The purpose of this chapter is to define Legal Ownership and its relationship with PO. What is Legal Ownership? When is it possible to say that someone is the owner of a specific object?

Since laws are a widespread phenomenon and PO appears to be universal, it is useful to take an international perspective on LO. In the previous paragraph, the importance of culture and its influence over ownership behaviours has been stated. People determine laws based on their beliefs, and culture has a significant impact on what people believe, so it is consequential to think that laws about property throughout the world show some cultural variation. In fact, countries around the world differ substantially in their laws about property. For the purpose of this paper laws about property in effect in Italy, Germany, USA and China will be analysed. Those countries and their laws are relevant for the discussion for several reasons: this paper has been written by an Italian student studying in an Italian university, therefore it was deemed necessary to discuss the national context; Germany has been included because it represents the most relevant European economy; USA have been included because, at the moment, they are the biggest and most influential economy in the world; finally, China has been included because it is the biggest economy outside the West.

Italy

Ownership in Italy is regulated by the Italian Constitution (Art. 42) and by the Civil Code (Art. 832 c.c.). The latter in particular states that “Il proprietario ha diritto di godere e disporre delle cose in modo pieno ed esclusivo, entro i limiti e con l'osservanza degli obblighi stabiliti dall'ordinamento giuridico.” Transl. “*the owner has the right to fully and exclusively enjoy and dispose of the property, within the limits and in compliance with the obligations established by the legal system [Articles 42, 43, 44 of the Constitution] (translated by Constitutional Court of the Italian Republic)*”. This means that the owner has the right to enjoy and to dispose of the property in whatever way he or she wants, but always under specific conditions, stated in Article 42, 43 and 44 of the Italian Constitution. In other words, the use of property is not absolute but delimited by obligations that tend to what is called “social function of ownership”.

Germany

The perspective of the German law about Ownership is deeply embedded in the principle of *Sozialpflichtigkeit*, stated in Art. 14 of Grundgesetz (German Basic Law, 2022). Like the social function of property in Italy, in Germany Ownership should tend to benefit the broader community, in an attempt to balance individual needs with

collective needs. Art. 14 of Grundgesetz states that “Eigentum verpflichtet. Sein Gebrauch soll zugleich dem Wohle der Allgemeinheit dienen.” Transl. “*Property entails obligations. Its use shall also serve the public good*” (translated by Professor Christian Tomuschat, Professor David P. Currie, Professor Donald P. Kommers and Raymond Kerr, in cooperation with the Language Service of the German Bundestag). Following this principle, expropriation is permitted only and exclusively to benefit the public good and the law establishes a compensation that “shall be determined by establishing an equitable balance between the public interest and the interests of those affected”. Consequently, the German government is active in urban management, and private property is viewed as something that needs to be balanced to favour both the individual and the collectivity.

USA

Ownership in USA is regulated by the Fifth Amendment of the Constitution, as follows: “... *nor shall private property be taken for public use, without just compensation*” (Constitution of the USA, 1787). As in Italy and Germany, USA Constitution protects private property as a right deeply linked with individual freedom, even though the state can expropriate property through the principle of “Eminent Domain”, defined as “the power of the government to take private property and convert it into public use, referred to as a taking”. Transferring of property from a private owner to another one is allowed only if this process results in a benefit for the public good.

China

China has very different ownership laws compared to Western countries. The Chinese Constitution and Property Law (2007) establish that property is owned by the state or by the community, instead of being owned by the individual like in the West. Chinese citizens are not allowed to own land but instead they get a temporary right of use. For residential properties, the most common right of use last 70 years, then it could be renovated or returned to the state. This approach is clearly coming from the nation’s communist past, even though new mechanisms are emerging. Nowadays, the Chinese economic system is described as *mixed*, meaning that it is the result of both socialist and capitalistic ideologies merged. This dichotomy allows the state to keep its control over key resources like banking and energy, while allowing privates businesses to flourish in other sectors. For instance, the temporary rights of use are still in force, but privates can

sell rights of use to other privates. China's concepts of ownership and property are changing rapidly, bringing out new discussions and challenges for the country.

Property laws reflect the cultural and social variability in the countries that adopt them. China is a fascinating example of this: Chinese laws reflect the communist background and the new and recent capitalistic implementation. A striking aspect to note again is the dichotomy between individualistic and collectivistic countries. As it was highlighted in the paragraph, Western countries tend to reflect their focus on the individual in their property laws, while other countries like China or some African nations tend to have a collectivistic approach, where possessions are owned by communities and not by single owners.

Legal and psychological ownership: Understanding the relationship through

Morewedge's model

Why do sometimes psychological ownership (PO) and legal ownership (LO) diverge? Morewedge (2021), a leading researcher in the field of psychological ownership, proposed an interesting dual-process model to explain why sometimes people feel PO towards objects they do not own and why the opposite is often true as well. The model is composed by two processes, the first one is implicit, and the second one explicit. Morewedge gives evidence of a corrective model, meaning that fast and implicit PO intuitions could be heavily influenced by later conscious and explicit evaluation of LO. The motivation, ability or opportunity to consider one's legal relationship with the item is pivotal in altering PO over the item.

Implicitly, an association between the object and the self is created when PO cues are present; the consequent self-object association is what leads people to feel PO towards an object. This is called system 1. The author highlights three psychological effects showing the pivotal role of associations in intuitions of ownership: 1) *self-object congruity*, an association between the self and an object leads to more accessible ownership intuitions; 2) *self-referential memory effect*. People remember better and for longer objects they own or owned (Cunningham et al., 2008). The explanation likely is the link with the self; 3) *Self-object associations in psychological ownership arise from the tendency to extend personal self-connections to owned objects, and similarly to adopt*

object connections as part of one's self-perception. Strong evidence of this phenomenon is the “mere-ownership effect” (Beggan and Allison, 1997).

The second process in the model consists in explicitly and consciously classifying an object as “mine”. This process, called system 2, consists in a conscious evaluation of one's LO over an object. Many studies investigated the role of expectation and conscious thinking over PO, and they have found a remarkable impact of the latter over the construct. Many explicit factors have an influence over PO, such as future predictions (planning to sell an item reduces PO, while planning to buy it enhances it), inclusion in the category of the self, changing perspective over an item after having bought it and many more. The corrective nature of the process is reflected in the way PO changes after people think about their legal relationship with the object. The author cites a study where an object was given to subjects with a 90% chance of keeping it. At the end of an experimental session they were more likely to show an endowment effect compared to subjects who had a 10% likelihood of keeping the same object (Ericson and Fuster, 2010).

In conclusion, the corrective model of PO is a still to-be-tested perspective about how PO and LO interact and influence each other, and it explains cases where an individual feels PO without LO (antecedents of PO are present without explicit evaluation of LO) and where someone does not feel PO with LO (antecedents of PO are absent).

Ownership – Economic definition

Law and economics use a lot of overlapping terms, and they interact in a consistent manner. In what aspects is the study of Ownership different between law and economics? A first difference that could be noted is the focus given to the nuances of the topic. While law puts emphasis on the normative side of the concept, meaning property and exclusion rights, economics focuses on the functional aspects of Ownership and on resource allocation. In this chapter, two examples of the use of ownership in economics are discussed.

A first example of use and a significant work about Ownership has been done by the ecologist Garrett Hardin in the context of the Tragedy of Commons (1968). The Tragedy of Commons is the conceptual situation where many people have unlimited access to the same finite and public resource. With time, the resource will eventually be overused and destroyed, leading to a net negative outcome. The concept heavily emphasizes the proclivity of people to be individualistic and to be following their personal interest even though long-term consequences of their actions are damaging the broader community. As Hardin (1968) puts it, “Freedom in a commons brings ruin to all” (p. 1244). Even though Hardin’s paper has more recently been criticized as simplistic (Hunter and Prakash, 2019), his theory has nonetheless been influential.

So, how do we solve the problem posed by the tragedy of Commons? Private property has often been indicated as the solution. Demsetz (1967) has extensively written about ownership and, in his *Toward a Theory of Property Rights*, he observed how property rights make people bear the costs of the use of a resource instead of posing them on society. In particular, “property rights develop to internalize externalities when the gains of internalization become larger than the cost of internalization” (p. 350). Externalities are defined as “The indirect effect of one agent's consumption activity or production activity on the well-being or economic activities of other agents” (Law, 2009).

Pollution and loud noise are classified as externalities because they damage others and society as a whole, but nevertheless the agent that indirectly causes them as a byproduct of his activities does not compensate for them. Demsetz (1967) explains that externalities are “internalized” (meaning “to bear the cost”) when “the gains of internalization are greater than the cost of implementing them” (Demsetz, 1967, p. 350).

As a piece of evidence, in his work the author cites some anthropological account where tribal populations were seen to shift from communal property to private property in the attempt to preserve local fauna after they realized their leather business was at risk due to overhunting. Within this framework, Demsetz (1967) affirms that private ownership forces agents to consider the social costs of their activities.

Innovation can also benefit from property rights. In economics, the Arrow information paradox refers to a specific phenomenon that happens when a company discloses or needs to disclose intellectual property across its boundary. The paradox takes its name from the economist Arrow (1962), who extensively investigated the relationship between innovation and intellectual property, and his work has been so influential that it is considered the theoretical basis for the incentive-based theory of patents. As the paradox suggests, a company that wants to advertise its services (intellectual material, in this context) needs to partially disclose some information to give buyers enough details to be able to decide whether they like the product or not. The main difference between intellectual property and material needs is that the former is in effect transferred to the buyer if disclosed, without any type of compensation. Material needs, on the opposite side, need to be possessed in order to use them. Usually, people buy rice because they want to eat it, not because they need to understand its functioning. But once a customer has understood the mechanisms or the logic behind an intellectual product, he or she does no longer need to buy it. Hence the need for patents to regulate the use of such information.

In his work, Arrow (1962) states that markets fail to allocate resource efficiently when dealing with intellectual property, and this is due to three reasons: 1) indivisibility, as this type of resource lose value if divided into smaller parts; 2) inappropriability, referring to the hard task of keeping knowledge private, and 3) uncertainty, that always comes with innovation. The benefits of sharing useful information in human societies are well-known: once someone has discovered or created something new, others can gain insights from it, leading to other creations and innovations. At the same time, inventors need to somehow protect their inventions. The goal of maintaining a healthy balance between the benefits for privates and the public good has sparked numerous debates about ownership of intellectual property and the implementation of patents.

Psychological ownership towards people? An additional framework for investigating PO.

In this article and in the broader scientific literature, psychological ownership (PO) has usually been studied only in relation to the feelings, intuitions and behaviours that humans experience towards items, space and abstract ideas. Despite this, there is enough evidence to hypothesize that the construct of PO likely extends also to other people. That is, people perceive other people as their possessions, in a way that resembles their attachment to items, space and abstract ideas. In the next chapter, a diverse spectrum of evidence in favour of this hypothesis will be presented, drawing from studies in evolution, anthropology and psychology.

Studying whether and how people perceive other people as “resources” could help explain many psychological and historical phenomena, and we should not limit ourselves in thinking that PO applies only to items or ideas. Slavery is an example. As Boyer (2022, page 2) states, “People may for instance state that ownership is necessarily about things, having forgotten that it applies to ideas as well, or judge that people cannot be property before being reminded of the history of slavery”. Another example is honour killing, where a husband tries to restore the family’s reputation by killing a woman after an event perceived as an honour violation (Elakkary et al., 2013). This phenomenon is based on the perspective that women are man’s property and that they reflect the family’s honour. As expected, this behaviour exhibits cultural differences (Caffaro et al., 2014).

Evidence of why ownership behaviours towards items and ideas are generally adaptive were discussed in previous chapters. Now, to understand whether humans perceive other people through the same conceptual schemas as they were resources or not, we should discuss what purpose PO satisfies and why humans could have evolved to feel that some people are “theirs”.

Lee Ellis, in his article *On the rudiments of possessions and property*, published in 1985, listed the categories of entities that humans behave possessively towards. For the purpose of this chapter, I will focus on three of them: romantic partners, offspring and familiar conspecifics other than romantic partners.

The basis of evolutionary theory is the fact that genes compete for survival. This competition is what drives evolution. Dawkins, in his *The Selfish Gene* (1976), expresses the idea that genes create and build our bodies, and they compete with each other “through” them. Dawkins was building his influential theorizing upon another breakthrough concept in evolutionary science, expressed in *The Genetical Evolution of Social Behaviour* by W. D. Hamilton (1964). Hamilton’s rule states that organisms behave altruistically when the costs they bear are outweighed by the benefits for those who are genetically related. Even though sacrificing oneself appears paradoxical in evolutionary terms, it is only and exclusively when the act helps other organisms that share the same genes survive. This phenomenon, called *kin selection*, is why animals are reported to behave altruistically usually only when genetically related with each other (Gorrell et al., 2010). So, it should come with no surprise that individuals tend to show differentiated caregiving behaviours between kin and non-kin (Burnstein et al., 1994), to exhibit higher violence towards non-kin compared to kin (Daly and Wilson, 1988), and to give less attention to stepchildren compared to their biological offspring (Anderson et al., 1999). Therefore, caring about one’s family and relatives is of pivotal importance in terms of evolutionary success and it represents an influent human motive/motivational factor. Within the framework of this hypothesis, PO would represent an effective evolutionary strategy for humans to be motivated in caring for their offspring and relatives.

This logic likely applies to copulatory partners as well, but the author of the present paper hypothesizes an additional reason humans evolved PO towards romantic partners. Due to natural and intrinsic reasons, males are never sure about the paternity of their partner’s child, a concept known as “paternal uncertainty”. Given this assumption, it is in the males’ interest to avoid any partner infidelity. This explains many behaviours like mate guarding and semen displacement (Burch and Gallup, 2020). Mate guarding, for example, is clearly connected with the feeling that the partner is “mine”. Shackelford et al. (2006) found that mate guarding behaviours were positively associated with more in-pair copulations, demonstrating that those behaviours actually work, despite a big investment in time and energy from the male partner. Burch and Gallup (2020) investigated 258 men who committed abuse and found that “sexual jealousy was cited more often than any other factor in the instigation and escalation of

conflict. Sexual jealousy also triggered increases in mate guarding and sexual violence but not physical violence”. According to the paternal assurance model (Gallup and Burch, 2006), they report that males escalated from sexual violence to physical violence only when they were aware that their partner was pregnant, they suspected, of someone else.

Sexual jealousy has been found to be triggered by different cues for males and females. Males tend to be more upset in case of sexual infidelity, while females tend to be more upset in case of emotional infidelity. Males and females also differ in the mate guarding strategy they use; males are usually more possessive, and they try to physically reduce the likelihood of their partner interacting with other men, while females tend to rely more on keeping the partner close by flirting with other men or by enhancing their physical appearance (Buss, 2002). This difference helps explain why mate guarding is physically more exhibited by males.

As many other phenomena, mate guarding behaviours have a very strong evolutionary purpose and they are expressed culturally. Religious veiling is a popular example. Pazhoohi et al. (2017) found that veiling was associated with harsher environments. A demanding environment enhances the need for more parental care, leading to a higher need for paternal assurance and more rigid mate guarding strategies. Pazhoohi et al. (2020) later replicated their findings with public data from 25 countries. Men were reported to agree to veiling much more than women and their support was positively correlated with the harshness of the environment. Researchers have investigated what factors could underlie ownership behaviours variability, and they found that “possessive jealousy was higher for those perceiving higher levels of parental control of mate choice” (Buunk and Castro Solano, 2012). This is because when someone is free to choose a partner, mate guarding behaviours and associated possessive jealousy is less necessary, and additional studies replicated their results (Buunk and Park, 2010). Grant and Montrose (2018) studied a diverse spectrum of patriarchal practices from an evolutionary perspective, and they concluded that patriarchy is a “unique form of mate guarding which is able to function even in the absence of males”. Their paper highlights how a patriarchal culture could dramatically enhance males’ fitness by enable benefits of monogamy and benefits of promiscuity for males without a compromise between the two.

Given this type of evidence, it is clear that paternal assurance and behaviours that favour it are incredibly important in the evolution of the human mating system. The author of the present paper hypothesizes that psychological ownership (PO) is what moves people towards actions like mate guarding strategies or acts dictated by sexual and emotional jealousy, as people are not aware of their evolutionary motives. As Buss (2002) puts it: “A man who discovers his wife in the act of intercourse with another man does not think to himself: ‘Let me see ... this event jeopardizes my certainty in genetic paternity in offspring, and hence threatens the successful proliferation of my genes relative to those of my rivals ... that makes me mad!’ Rather, jealousy becomes activated, physiology aroused, and consequent mate guarding behaviour performed. Successful mate guarding does not require conscious awareness of the adaptive logic of why mate guarding mechanisms evolved” (p. 28). The hypothesis provided here is that the mere and affective feeling of PO underlies such behaviours. Dillon et al. (2014) studied married couples and report that spouses felt possessiveness towards their partners more when the latter was attractive. The feeling of possessiveness, in turn, led spouses to be willing to touch their partner, with a higher desire found in husbands. These results are coherent with the explanation that one of the routes through which PO originates is touch (see paragraph “*perceived control*”).

This chapter has been built upon the evolutionary studies previously discussed and proposed a new research framework for studying PO. The author showed evidence of PO being a very plausible explanation for the affective component of possessive behaviours, directed towards physical items, ideas/intellectual property, and towards kins and romantic partners. Within this view, PO is deemed to be what drives people towards those acts and feelings, as human are not aware of their evolutionary motives, just as they do not need to be aware of the evolutionary purpose of hunger to be hungry.

Ownership as a candidate for moral domain in MFT?

Moral Foundations theory (MFT) is currently considered the main theory explaining morality in humans. Previously, authors contemplated the possibility that ownership could be a new moral domain within the framework of this theory (Atari & Haidt, 2023). The authors of the MFT established 5 criteria that a specific construct must meet in order to be considered a moral foundation (Graham et al., 2013). This paragraph will represent a brief analysis of all of them to understand whether Ownership constitutes a candidate to be included in the theory.

- 1) *A common concern in third-party normative judgments.* The authors here underline how humans live in what they call “moral matrices”, meaning an environment where people reinforce moral norms and where they can create a collective standard of acceptable and optimal behaviour. If a concept is a moral foundation, then people will talk about it and they will make judgments, especially in case norms are not respected. As we have seen, ownership intuitions are ubiquitous and very common in everyday life. Examples are “do not take that, it is *mine!*”, “she is *my* girlfriend”, and many others. Friedman and Neary (2008) stated that “Ownership is social because we not only think about what we own, but routinely reason about what others own. Doing so allows us to avoid the social conflicts that would arise if we treated others’ property as our own or in other inappropriate ways, and is therefore essential for normal social interaction”.
- 2) *Automatic affective evaluations.* The authors here emphasize the role of rapid and automatic affective reactions. Morality is so pivotal to humans that we do not usually think about it extensively, we feel it somehow. Moral foundations should therefore elicit automatic and affective reactions and judgements. Ownership intuitions are automatic and, as explained in the previous chapter, likely elicited by affective intuitions that have roots in our evolutionary past. More research on the affective components of ownership is needed, but the probabilities that the construct satisfies this criterion are very high.
- 3) *Being culturally widespread.* Since the MFT theory focuses also on the evolutionary purposes of moral foundations, we expect to see the same moral intuitions in most of the human cultures. As explained in the previous chapters, ownership has been found in every human culture and possessives are present in

every language. Even though culture plays a big role, as highlighted with the Endowment effect in hunter-gatherers (see chapter “Ownership – Anthropological Definition”), ownership intuitions are convincingly thought to be universal.

- 4) *Evidence of innate preparedness.* Evidence that a behaviour is innate makes the hypothesis that a construct is a moral foundation stronger. As the authors highlight in the paper, some of the best evidence is finding the same behaviour in other animals, especially primates. Ownership behaviours are present in many other species (Strassman and Queller, 2014; Kummer and Cords, 1991; Brosnan, 2011), suggesting a evolutionary advantage and development.
- 5) *Evolutionary model demonstrates adaptive advantage.* The previous criteria partly already showed how ownership satisfies this criterion (see also dedicated chapter). Graham et al. (2013), stated that “another important safeguard against ‘just-so’ thinking is to rely upon already-existing evolutionary theories”. For instance, Trivers’ theory perfectly matches with ownership intuitions and several mathematical models demonstrated its efficacy in solving the Tragedy of Commons (Shu & Peck, 2018; Hare et al., 2016).

This brief overview of the match between ownership and the criteria for “foundationhood” should have highlighted that this construct is very likely a moral foundation. More research is needed to deepen our knowledge about ownership and how it varies and interacts with other variables. Studies investigating the affective aspect of such intuitions are specifically needed to understand the phenomenon from a psychological perspective, and those studies are currently absent in the scientific literature. The next section will draw from this type of evidence, and it will present some demographic data and it represents one of the first attempt to measure PO quantitatively.

Study – Investigating correlations between PO, Socio-economic status (SES) and Age²

Some studies tried to investigate variations in the emergence and in the expression of the construct of PO. For instance, a study by Noles et al. (2012) looked at whether moral intuitions about ownership could change through development. Evidence shows how children's intuitions about ownership gradually evolve to the ones that adults experience over time. Hook (1993) reports that children distinguish property rights between owners and non-owners, but they do not acknowledge the same property rights to owners as adults do until age 8. They do not seem to understand that owners have transfer, use or right to access over their own property yet. Even though children show a surprising and gradual understanding of ownership, they seem to rely more on concepts like use or proximity to navigate the relationships between objects and people, without fully understanding significant psychological variables that adults use to draw conclusions about possession (Snare, 1972). Noles and colleagues suggest that there is a gap in research regarding what people deem necessary to be considered an owner. Their hypothesis is that people draw conclusions based on whether the owner has a minimum cognitive requirement or not. The study addressed the question by asking to identify whether four kinds of individuals could be owners: typical humans, non-human animals, artifacts, and atypical humans. Children and adults ($N = 240$) both acknowledged property rights to individuals who were awake, asleep, or tied up, but children denied that these rights applied to atypical humans too. Authors concluded that: "Although both children and adults use an ontological boundary to guide their ownership attributions, concepts of owners change significantly over the course of development". Another study by Cunningham et al. (2008) looked at the relationship between memory and PO. Authors found that participants better remembered objects which had been described as belonging to them. Simply interacting with those items made no difference in the memory test.

² This section has been written under the supervision and guidance of Professor Arman Catterson from University of California – Berkeley. I am sincerely grateful for his advice and the inspiration he gave me.

Only a few scales measuring psychological ownership have been created and they are meant to be used in organizational settings. The present study aimed at creating a questionnaire investigating the construct of PO and its relationship with demographic variables. Validating a scale measuring PO would create many opportunities for researchers to explore how the construct of PO impacts peoples' daily behaviours and moral intuitions. The effects of age on PO have been investigated in the above-mentioning studies, but there is a strong need for replication for two main reasons: firstly, one study is not enough to fully understand how the construct varies with age. While Noles et al. (2012) compared children and adults, the present study is focused only on people above 18 years old to verify whether additional differences appear even after individuals reach the adult stage; secondly, the above-mentioned studies have not elucidated how the patterns the authors found arise and why specifically. The present study looks also at SES and whether it has some effects on PO. Previous research by Haidt et al., (1993) showed that different socioeconomic environments cause huge differences in whether people consider an issue either a moral problem or a personal stance. High SES Brazilians were found to have a more similar moral functioning with high SES US citizens compared to low SES Brazilians. This and other studies suggesting that SES and morality are strongly linked highlight the need to research if there is any relationship between SES and PO. A similar relationship is likely to be found given the connection between the quantity and quality of the resources that an individual possesses and his/her SES. High amounts of resources could change how people perceive items and their attachment to the items themselves.

The present study is also meant to gather data on another preliminary hypothesis by the researcher. The author of this study believes that the same construct of PO is what drives people to feel ownership intuitions towards physical items (such as possessions and resources), ideas such as intellectual property and towards the relationships they have. Within this framework, PO could be seen as responsible for the moral intuitions arising when people describe someone else, most often romantic partners, offspring and kins, as "theirs". Sentences and feelings of possession towards loved ones as something it is possible to "own" are ubiquitous and present in almost every culture. Advancing research on PO could clarify whether the construct is related

or partially accountable for these behaviours or whether other constructs like jealousy are better explanation. Self-report data could possibly be used to understand if there is a discrepancy between how people perceive themselves in regard to the owned items and how they effectively behave in regard to the items themselves by comparing it to more objective measures with higher ecological validity.

Methods

For this study, 101 subjects were recruited online between the 16th of April 2024 and the 2nd of May 2024. The subjects filled out a Google Forms questionnaire investigating psychological ownership. The questionnaire consisted in a Google Forms link that was personally sent to every volunteer subject with basic info such as the topic of the study and the estimated time required to complete it. The first subjects to fill out the questionnaire were acquaintances, relatives and friends. Many of them, in turn, sent the link to their relatives, friends and acquaintances. The research has been conducted under the supervision of Professor Arman Catterson from University of California – Berkeley within the context of the *PSYCH 101: Research and Data Analysis in Psychology* course. Subjects have been informed before completing the questionnaire that their answers would be completely anonymous and that the researcher could not associate their responses with their names.

Participants first read some details about the study and how they were supposed to answer to the questions (e.g. “the first instinctive answer is usually the best one”). They were reminded that their answers were anonymous and then they proceeded to answer demographic questions about age, sex, SES, country of origin, and ethnicity. After that, eighteen items regarding psychological ownership of ideas, physical items and people were presented to the subjects.

There were no prior exclusion criteria, and no subject has been excluded from the data. There is no missing data in the answers. The average age in the dataset is thirty-eight, with most of the subjects aged between 20 and 25 and between 50 and 65. The sample has a slight prevalence of female subjects (52) compared to male ones (47). Two subjects reported to be non-binary (see Figure 4). Country of origin of the subjects was also considered. The sample has gathered data from subjects from 22 countries (see Figure 5), even though the vast majority are Italian citizens (72 subjects on a total of 101). Sixty-three subjects reported to have an income of less than 25.000\$ per year. 20 subjects reported to have an annual income between 50.000\$ and 75.000\$, 7 report to have an income of 75.000\$ and 100.000\$ per year, 5 report to earn between 100.000\$ and 125.000\$ per year, 2 report to earn between 125.000\$ and 150.000\$ per year and 4

report to have an annual salary higher than 150.000\$. Due to a working error the subjects were not able to select the SES level “from 25.000\$ to 50.000\$ per year”. Prior research has investigated the relationship between ethnicity and morality, so this variable was included in the data. Most of the subjects reported to be Caucasian (71). Other ethnicities included were Hispanic (18), Mixed Ethnic Group (9) and Asian (3) (see Figure 6). Two versions of the same questionnaire have been created, one in English and one in Italian. The purpose was to make answering the questions accessible even to Italian people not familiar with English. Seventy-four subjects took the Italian version of the questionnaire and twenty-seven the English one (see Figure 7).

A completely new scale was developed at the start of April 2024 because the only scales investigating psychological ownership are related to organizational settings and they were likely not capable of capturing the interpersonal nuances that this study was trying to investigate. It was decided not to adapt organizational scales because of the enormous difference between their target and the target of the present study. Some of them seemed to investigate the sense of belonging that workers feel towards their workplace compared to the feeling of possessiveness towards items, ideas, and people that this paper has discussed. An additional reason why existing scales were considered insufficient was the number of items they offered. Some of them offered 6 items (for an example, see Su and Ng, 2019), and complex dynamics like ownership behaviours are hardly properly captured by such a small number of items. After a few attempts, it became clear that drawing from existing scales was like changing the scale completely due to the intrinsic differences found between the topics of interest (organizational setting vs interpersonal dynamics). Therefore, it was deemed necessary to create a new scale.

The items were created to investigate psychological ownership towards items, ideas, and people, to test the factorial structure of the construct. This operation has been done to verify whether some people are more attached to one entity compared to others (for instance, a subject that is more possessive towards items compared to ideas and people) or subjects tend to exhibit the same level of possessiveness towards all entities. Eighteen items have been considered enough to cover all the nuances of the construct. This pool of item represents the entirety of the items created. There were no items removed from the pool and no additional test has been made on the scale. This absence of additional testing has two fundamental reasons: firstly, there was no time to evaluate the scale within of the context of the *PSYCH101* course. Testing and validating a scale usually require years and this amount of time was clearly outside the possibilities of the study; secondly, the present scale represents a specific attempt to measure PO and its interpersonal and romantic nuances, and it has not been devised to be used in its actual form. Its purpose is to be a foundation for later and revised scales that will draw on this one.

The items of the scale are the following:

I get angry when someone touches my things.

It's important for others to know that my property should be respected.

I often feel me and my partner as if we were one.

I often feel like a member of the opposite sex is trying to get close to my partner all the time.

I get angry when someone takes my ideas without saying they are mine.

I think it's great when people take my ideas and use them without giving me credit. *

I get angry when someone is talking to my partner.

I question my partner about previous or present romantic relationships.

When someone else takes my ideas I feel as something mine is being stolen.

I feel connected to the things I have control over.

I often feel objects as "close to me", not only on a physical level.

I do not feel threatened when someone else is touching my possessions. *

I do not like to introduce my friends to other people because I feel my friends are mine.

I do not like when I introduced a friend to another friend and they start to hang out together.

I feel annoyed when, on public transportation, after having been to the bathroom, I come back to the seat I was occupying and I found someone else seating there.

I do not feel angry when people interact with my things. *

When someone is talking to my partner, I feel as someone is trying to steal something mine.

I am annoyed when someone uses a funny joke I made to make others laugh.

*Negatively-keyed item.

Participants answered all the questions on a Likert scale from 1 (strongly disagree) to 7 (Strongly agree). The reason why a scale from 1 to 7 was preferred over a scale from 1 to 6 or similar is that many subjects have never thought extensively about ownership and how they feel it. The choice was made to give the subjects the opportunity to maintain a neutral stance, as some of them could have been indifferent to certain items.

The variable Psychological Ownership has been treated as a continuous variable and it has been created from the above-mentioned Likert scale. The scale was composed of 7 items regarding PO towards physical items, 7 regarding PO towards relationships and 4 about PO towards ideas. The aim of the present study was to create a variable that was able to include all the nuances of PO. Research on PO established that people experience intuitions of possessions towards physical items and ideas, so those two components were highlighted in the scale. As mentioned in the introduction, the present study serves also as a first approach to the hypothesis that PO extends to relationships too. This is reflected in the 7 items regarding the relationship between people and their romantic partners or friends that were included in the scale. Since the scale used in the present study was created for the purpose of the study and it has never been used before, its reliability and validity must be discussed. The scale tried to include all the entities you can possibly feel ownership towards, meaning physical items, ideas and relationships. The study was conducted using the same questionnaire in Italian and in English. The conformity between the two questionnaires has been evaluated by an Italo American student studying at UC Berkeley when the research was conducted.

The scale, being a self-report measure, likely resents of the social desirability bias. There is a negative attitude towards people who are very possessive towards their belongings and especially towards their romantic partners or friends. Sociocultural changes in the way romantic partners interact likely caused the emergence of this attitude and this could have impacted the results, even though answers were completely anonymous. Cronbach's Alpha was evaluated to evaluate the scale's reliability. The test resulted in a raw Alpha value of 0.67, indicating that the reliability of the scale is suboptimal (threshold for reliability being > 0.8). This result has multiple explanations. One of them is that different items or a different number of items would be needed to enhance the scale's reliability. A second explanation could be that the scale is not capturing the construct of interest. Statistical analysis on the subcomponents of the scale (PO towards physical objects, PO towards ideas and PO towards relationships) revealed that the three types of items have a similar raw Alpha value, even though the items about PO towards relationships show a slightly higher value (0.63, 0.66 and 0.71, respectively). Paradoxically, the items with the least evidence from the literature and

with the highest social desirability bias are also the most reliable. Future attempts to create a scale for PO should focus on increasing reliability and validity of the items to make sure the correct construct is being captured. The present study showed that the items used to investigate PO towards relationships are a good first attempt to capture the interpersonal nuances of PO.

The independent variables (IV) that were investigated in the present study were age, SES, even though other variables were collected in order to better understand potential confounding variables. For the purpose of the PSYCH101 Final Project, only age and SES will be considered. The IVs were self-report measures of age and SES. The measure of age is considered reliable and valid, since the subjects were free to express their biological age without restrictions and no apparent bias towards age responses seems to be present in the study (see Table 2). SES was established with a multiple options question. As mentioned previously, due to a technical error the subjects were not able to select the option “SES from 25.000\$ to 50.000\$ per year”. This could have been nudging some subjects to report to have a higher or lower SES compared to the one they have. Most of the subjects reported to have a SES of less than 25.000\$ per year (see Table 3). Since many subjects were student, they do not likely have a personal income to refer to and their parents or families are financing them throughout their studies. The author suspects a high likelihood of some student reporting their personal SES (0\$ per year for some students), even though they have access to the resources of their family. This misunderstanding could have caused lower accuracy in the data, and it is something to fix in future studies.

Results

The dependent variable (DV) the present study was looking at was the construct of Psychological Ownership (PO). The independent variables (IV) studied were AGE and SES. The study used three models, two bivariate models and one multivariate model, to investigate the hypothesis.

Hypothesis 1

To test the first hypothesis, a linear regression analysis was conducted to predict PO from AGE. Results are visible in Table 4. AGE predicts 6% of the variation in PO, based on R^2 . The two variables are negatively related, meaning that PO seems to be less present in older people. P-value (0.01373) is below .05, indicating that the model has statistical significance. Confidence Intervals do not include zero, indicating a lower probability of the slope being found by random chance. The model suggests that AGE is a variable that needs to be considered when making predictions about ownership.

Hypothesis 2

To test the second hypothesis, a linear regression analysis was conducted to predict PO from the reported SES of the subjects. Results are visible in Table 5. R^2 value indicates that SES accounts for 12.2% of the total variation of PO in the sample, suggesting that SES has a great predictive power when it comes to predict PO from demographic data. The p-value (0.02799) is below .05, suggesting that the model has statistical significance. A more complex result is found in the difference between the slopes of every SES level. The data suggests that people in some SES levels are less likely to experience a strong PO construct compared to people in other SES levels. The range of the slopes is between -0.98507 and 0.44826. This variability likely indicates that at least some SES level had not enough subjects to have accurate predictions, and it likely indicates that some other factor is shaping the responses of the individuals in different SES levels. Nevertheless, SES seems to be a good predictor of PO.

Comparison of Bivariate Models

Results from Model 1 and Model 2 show that AGE and SES may be strong predictors of PO. R^2 values indicate that SES is a better predictor than AGE when it comes to PO. Different SES levels appear to lead to different outcomes of PO. Bootstrapping found a sampling error of 0.4331 (SD of the Bootstrapped distribution). The value is higher than some slopes found in the model, suggesting that there could be differential sampling error between different SES levels. Confidence Intervals include 0, indicating that slopes could be found by chance. There is support for the first two hypothesis. The present study suggests that both AGE and SES should be considered when predicting PO. After these findings, the author wondered whether there is a mediation or moderation effect between AGE and SES on PO. This is the hypothesis tested in Model 3.

Model 3

To test the third hypothesis, a multiple linear regression model was conducted to predict PO from AGE while controlling for SES. As seen in the previous bivariate models, PO is greatly influenced by AGE and SES, which highlights the importance of controlling for another independent variable when exploring the effects of a specific independent variable. The variables have been standardized. Results from the model are visible in Table 6 and 7. When controlling for SES, AGE is still a good predictor of PO, even though its slope decreases slightly (-0.010782, p-value = 0.007981). P-value below .05 indicates statistical significance. In Model 3 slopes for SES levels have somewhat changed. A comparison between the slopes when considering SES alone and when considering SES with age are visible in Table 8. Slopes have maintained their positivity or negativity while changing slightly, except for SES level >150.000\$ per year, changing from -0.01483 in Model 2 to 0.169573 in Model 3. This change is likely due to a lack of subjects in that specific SES level. Bootstrapping resulted in an estimated sampling error of 0.0052 (SD of the bootstrapped distribution), indicating low sampling error. However, Confidence Intervals include 0, suggesting higher likelihood of the slope being found by chance. The multivariate model has more predictive power than Model 2, having an R^2 value of 0.1657, suggesting that AGE, when controlling for

SES, accounts for 16.6% of the total variation of PO. AGE seems to be a stronger predictor of PO; even though the AGE slope decreases in Model 3.

Tables and figures

Hypothesis	Null Hypothesis	Alternative
Hypothesis 1 (PO ~ SES)	SES has no influence over PO.	PO is affected by SES.
Hypothesis 2 (PO ~ AGE)	AGE has no influence over PO.	PO is affected by AGE.
Hypothesis 3 (PO ~ AGE + SES)	SES and AGE do not impact PO.	PO is impacted by SES and AGE.

Table 1. Hypothesis investigated in the present study.

Variable	Alpha Reliability	Mean	SD	Range of the answers
Psychological Ownership	0.67	3.6 (on a Likert scale from 1 to 7)	0.8	4.17
Age		38	16.8	53

Table 2. Values of variables PO and Age.

SES	< 25.000\$ per year	50.000\$ - 75.000\$ per year	75.000\$ - 100.000\$ per year	100.000\$ - 125.000\$ per year	125.000\$ - 150.000\$ per year	> 150.000\$ per year
Frequency	63	20	7	5	2	4

Table 3. Frequency for variable SES.

Model 1.

Model 1 investigated the relationship between PO and AGE. In the table below are reported the graph, the intercept, the slope, R^2 , Confidence Intervals and P-Value of

Model 1 = PO predicted from AGE	Intercept	Slope	R^2	CI	P-Value
Value	4.045762	-0.011673*	0.05979	[-0.01989467 , -0.00349610 6]	0.01373

Table 4. Data from Model 1 predicting PO from AGE.

Note: * $p < .05$, ** $p < .01$.

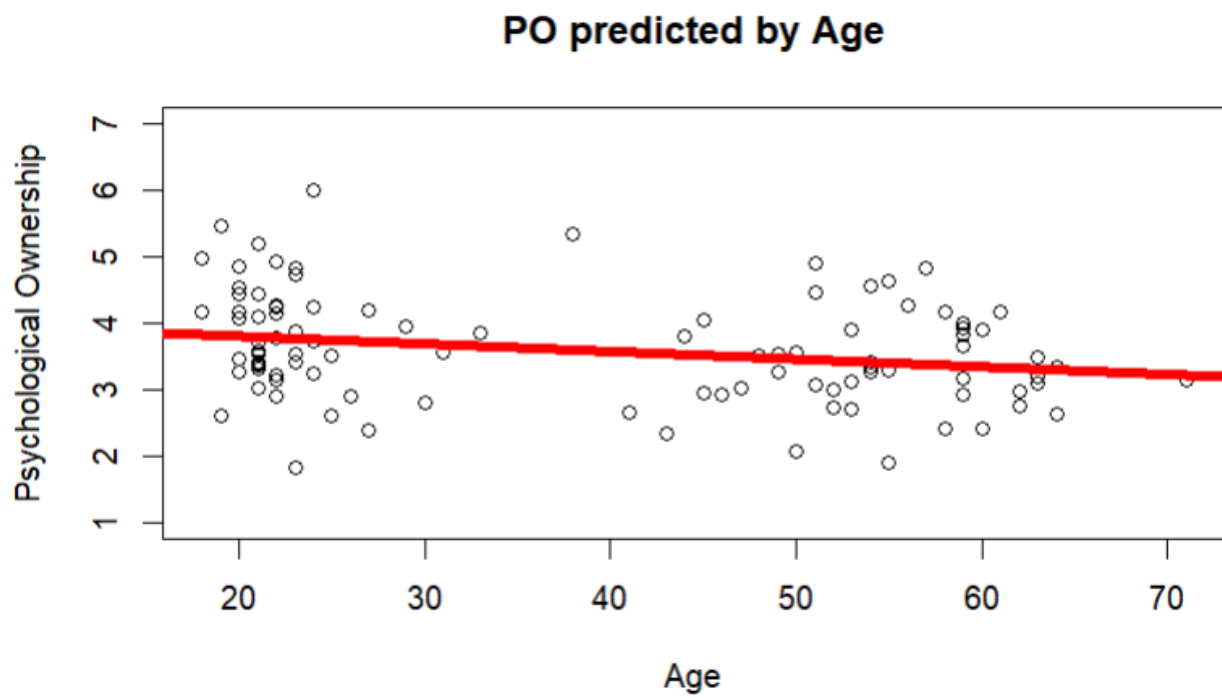


Figure 1. Linear model predicting PO from AGE.

Model 2.

Model 2 investigated the relationship between PO and SES. In Table 5 (below) are reported the graph, the intercept, the slope, R^2 , Confidence Intervals and P-Value of the model.

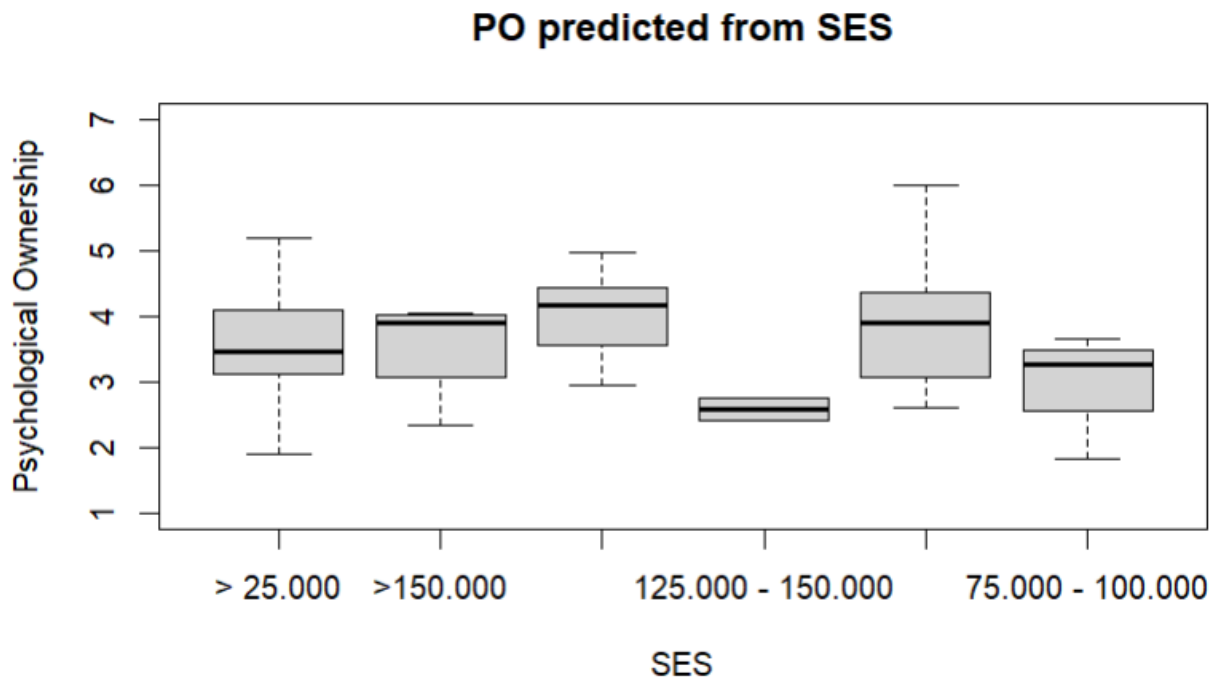


Figure 2. Linear model prediction PO from SES.

Model 2 = PO predicted from SES	Intercept	Slope	R ²	CI	P-Value
Value	3.56841	SES: >150.000 -0.01483 SES: 100.000 - 125. 000 0.44826 SES: 125.000 - 150. 000 -0.98507 SES: 50.000 - 75.00 0 0.36195 SES: 75.000 - 100.0 00 -0.58711	0.122	[-0.8397449, 0.8582634]	0.02799

Table 5. Data from Model 2 predicting PO from SES. Note: * $p < .05$, ** $p < .01$.

Model 3.

Model 3 was based on multiple regression analysis, and it investigated the relationship between PO and AGE when SES was also considered. In tables 6 and 7 (below) are reported the intercept, the slope, R^2 , Confidence Intervals and P-Value of the model.

Model 3 = PO ~ AGE + SES	Intercept	Slope (based on the variable AGE)	R^2	CI	P-Value
Value	3.939272	-0.010782 *	0.1657	[-0.02093837, -0.0009694567]	0.007981

Table 6. Data from Model 3, predicting PO from age when SES is also considered.

Model 3 = PO ~ AGE + SES	50.000 – 75.000	75.000 – 100.000	100.000 – 125.000	125.000 – 150.000	>150.000
Slope	0.453633*	-0.434282	0.407324	-0.709019	0.169573

Table 7. Data from Model 3. The slopes of the model are listed based on the SES category.

Note: * $p < .05$, ** $p < .01$.

DV = PO	Model 1 (AGE)	Model 2 (SES)	Model 3 (AGE + SES)
Intercept	4.04576	3.56841	3.93927
IV1 = AGE	-0.011673*		-0.01078* (AGE) CI: [-0.02093837, -0.0009694567]
IV2 = SES		SES: 50.000 - 75.000 0.36195 SES: 75.000 - 100.000 -0.58711 SES: 100.000 - 125.000 0.44826 SES: 125.000 - 150.000 -0.98507 SES: >150.000 -0.01483 CI: [-0.8397449, 0.8582634]	SES: 50.000 – 75.000 0.453633* 75.000 – 100.000 -0.434282 100.000 – 125.000 0.407324 125.000 – 150.000 -0.709019 >150.000 0.169573 CI: [-0.02093837, -0.0009694567]
R ²	0.0597857	0.122	0.1657

Table 8. The table shows the results of the study.

Note: * p < .05, ** p < .01.

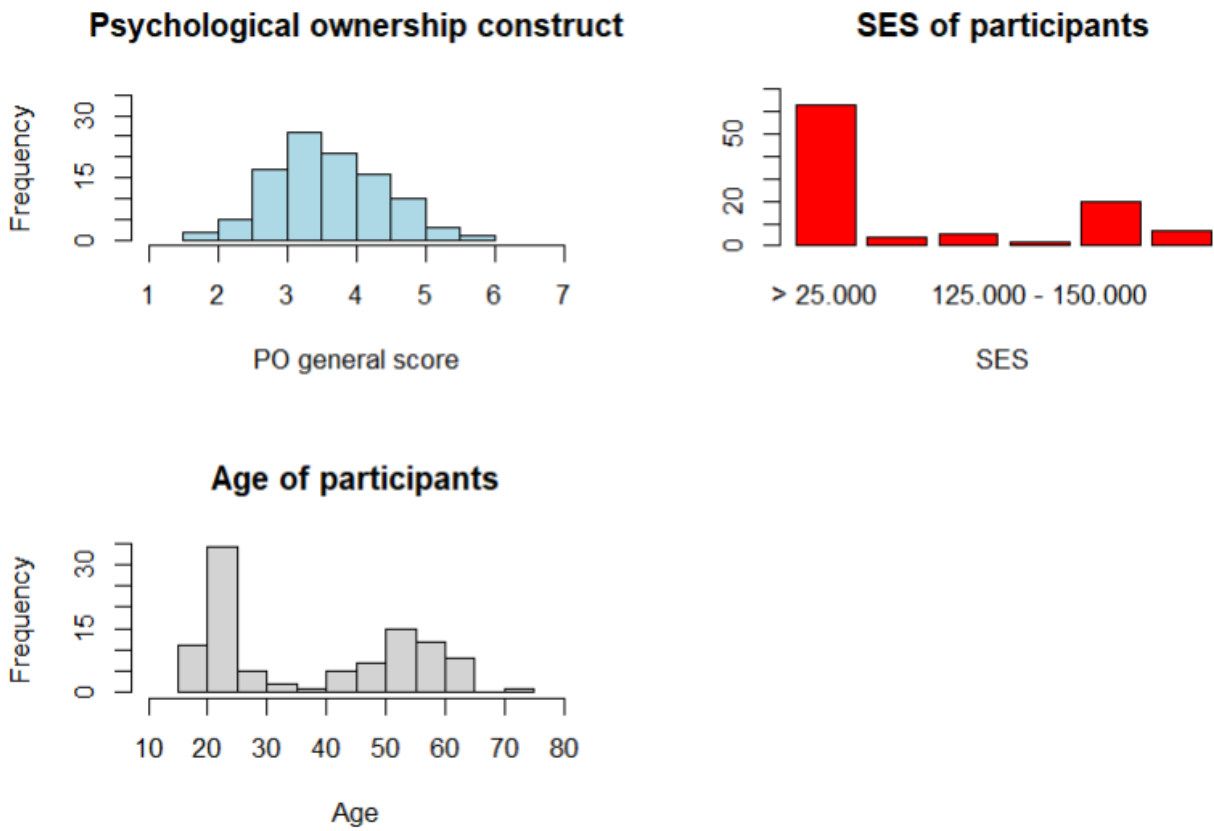


Figure 3. The figures show the graphs of PO, SES and AGE of participants.

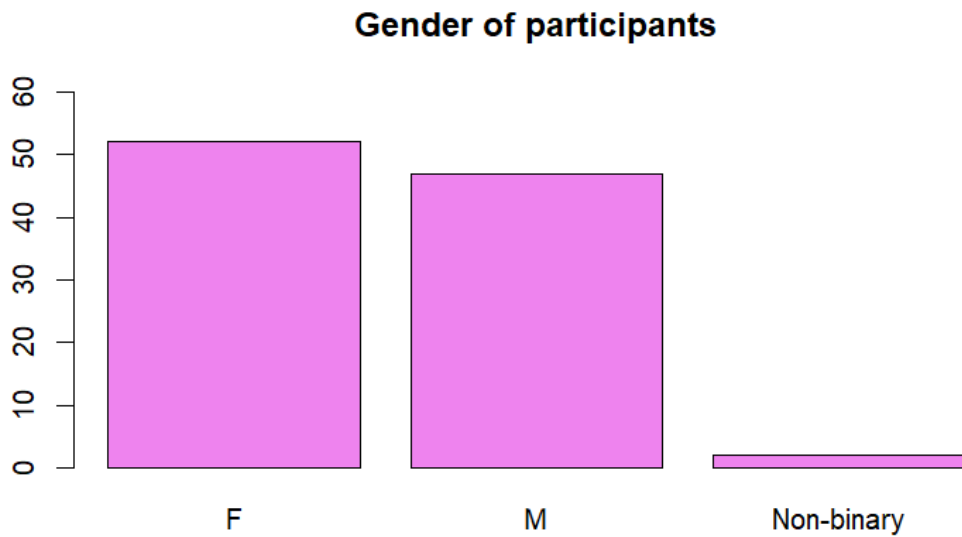


Figure 4. The graph shows the gender of the subjects in the sample.

Belarus	Brazil	Bulgaria	Czech republic	Denmark	France
1	1	1	2	1	1
Germany	Greece	Hong Kong	Ireland	Italy	Mexico
1	1	1	4	72	1
New Zealand	Northern Ireland	Norway	Norway	Peru	Romania
1	2	2	1	1	1
South Africa	Ukraine	United Kingdom	USA		
1	1	1	3		

Figure 5. Countries of origin of the subjects and their prevalence.

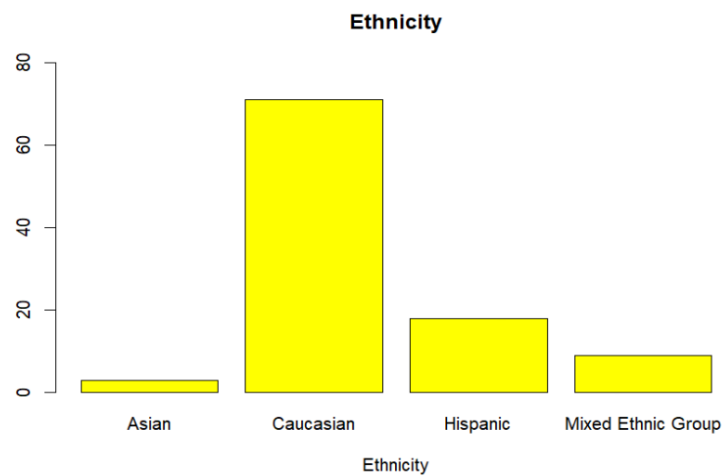


Figure 6. The graph shows the ethnicity of the subjects.

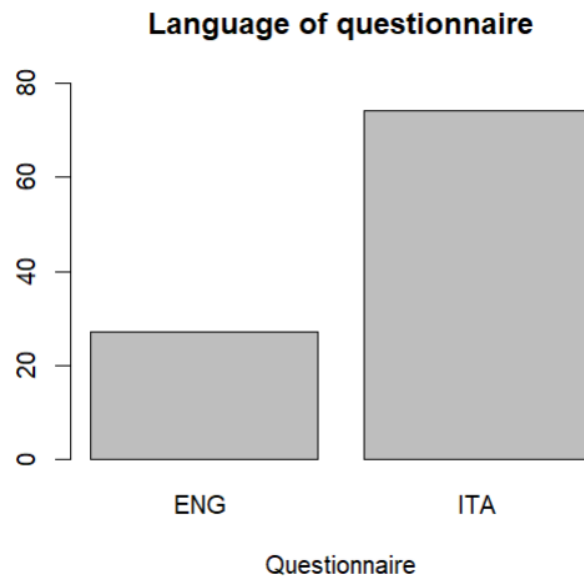


Figure 7. The graph shows how many subjects took the questionnaire in English and how many took it in Italian.

Discussion

Past research has found AGE and SES to be impactful factors on morality and moral intuitions. It was conducted a study to investigate whether these factors are influencing Psychological Ownership (PO) too, as to date no previous numerical account of how these variables affect PO has been published. The study supported the original hypothesis. Results indicate that the two IVs influence PO by a significant degree. SES seemed at first the strongest predictor of PO between the two, but testing of Model 3 revealed that, when controlling for SES, AGE accounts for 16% of the variation in PO. Despite this, the underlying mechanisms by which AGE and SES influence PO remain unclear. Many factors influence a complex construct like PO, such as culture and ethnicity, level of education, the current historical period and the upbringing. AGE and SES themselves are difficult to decipher in relation to PO. Are the differences in PO due to a minimum cognitive requirement to understand the relationships between people and entities, as suggested by Noles et al. (2012), or is the view of resources that changes the explanation for the phenomenon?

The present study has found interesting and promising results about the relationship between SES and PO. Nevertheless, some limitations about the validity of the results regarding SES need to be considered. First, the subjects, due to a technical error, were not able to report an income that falls between 25.000\$ and 50.000\$ per year. This error likely reduces the accuracy of the results and therefore it makes the results less valid. Second, many subjects were university students and some of them likely reported to have a SES level lower than 25.000\$, when they likely have access to their parents' and families' resources. They could show a PO score of someone with a higher SES even though they reported to have a lower SES.

In general, the study suffers from a suboptimal reliability and a better check of the factorial structure is needed. Some of the reasons have been highlighted above. In addition to that, Alpha reliability scores were lower than optimal for every subcomponent of the scale. The scale seemed not to have captured the construct with enough accuracy, likely due to a suboptimal selection of items. Researchers interested in developing a scale to measure PO should invest time in creating alternative items and in investigating whether questions about specific entities and not others can capture the

construct with higher accuracy. The subscale about PO towards relationships showed to be the most reliable based on the Alpha reliability test, and therefore it could represent a good starting point for researchers willing to develop a scale to measure how people perceive their loved ones as “theirs”. Exploratory factor analysis (EFA) was conducted on the data, and it revealed that, in this dataset, a 3-factor theorization does not emerge empirically. Despite this, EFA found a latent factor constituted by 14 items with a Cronbach’s alpha of .83. This result suggests that the scale captured a construct, even though we cannot be precisely sure about what it captured. It also suggests that, by removing a few items from the scale, the reliability score increases greatly. The scale is probably a good starting point considering that it is a first attempt of measuring PO numerically, and with some corrections it could become a reliable tool.

Future research should address validity and reliability problems first. Without a validated scale, every inquiry will never be reliable enough to be a foundation for the next studies. Creating and validating a scale to measure PO will open research on moral intuitions to endless possibilities to investigate how the construct works and its prevalence. The subscale about PO towards relationships should be tested for discriminant validity with similar constructs, such as jealousy. Once a scale will be created and validated, researchers will be able to clarify the underlying causal mechanisms of demographic variables that influence PO.

Conclusions

The paper investigated psychological ownership (PO) from a theoretical and a quantitative standpoint and it originated from the need of additional knowledge about the topic. The construct was defined within the perspective of four different subjects (psychology, anthropology, law, economy) to show that ownership is an ever-present concept in human life. The psychological definition highlighted that PO is studied less extensively than other psychological concepts, with a specific lack of knowledge about the affective aspect of it. The anthropological definition revealed that culture explains the variation in the construct, even though much of the available evidence suggests that ownership is so ubiquitous and consistent that it is likely innate. Defining laws about ownership in four different countries (Italy, Germany, USA and China) showed again that cultural and historical variables end up changing the countries' approach towards possession. Finally, a brief economic overview demonstrated that the concept of ownership is useful even in managing intellectual property and its value.

Then, an additional framework about the construct was provided. PO has been deemed to be the affective component that drives people towards possessive behaviours such as mate guarding. Related evolutionary evidence was given. Then, it was suggested that ownership satisfies all the criteria needed to be considered a moral foundation within the framework of the Moral Foundations Theory (MFT). Considering ownership intuitions as something embedded in our morality would help explain their pervasiveness and innateness.

Finally, the paper included a study investigating the relationship between psychological ownership (PO) and demographic variables (age and socio-economic status). A new scale was proposed to quantitatively measure PO because of the need for new measurement tools and because of the theoretical assumptions originated from the examination from the first chapters. The scale shows suboptimal reliability, and it needs to be improved, but it represents a good attempt in the task of measuring PO. Other researchers could draw useful insights from this attempt and develop better measurements tools. Data revealed that age and socio-economic status (SES) show a strong predictive value, with the latter being a stronger predictor. The results are discussed as well as the limitations, suggesting future research lines for a more precise investigation of PO.

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[Besserat+D.&title=An+ancient+token+system%3A+the+precursor+to+numerals+and+writing](http://scholar.google.com/scholar_lookup?hl=en&volume=39&publication_year=1986&pages=32-39&journal=Archaeology&author=Schmandt-Besserat+D.&title=An+ancient+token+system%3A+the+precursor+to+numerals+and+writing)

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