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## When Objects Become Part of Self: Effects of Ownership and Choice on Self-object Associations

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A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

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WHEN OBJECTS BECOME PART OF SELF:  
EFFECTS OF OWNERSHIP AND CHOICE ON SELF-OBJECT ASSOCIATIONS

(Thesis format: Monograph)

by

Yang Ye

Graduate Program in Psychology

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy

The School of Graduate and Postdoctoral Studies  
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## Abstract

Despite its significant role in the society, ownership has received little research attention from social psychology. Understanding ownership as a form of people-object relations has important implications for social cognition, as the relations between people and objects share similar mechanisms with the relations between people and other social entities. Adopting an associative approach to relations, the present research investigates how ownership influences self-object association—mental associations between the owner’s self and the owned objects in the owner’s associative network. It is argued that the formation of self-object associations is gated by the levels of congruence or incongruence between the owner’s active representation of the self and those of the objects. In five experimental studies, the effects of ownership on self-object associations were examined in two types of ownership scenario. In the mere-ownership scenario, participants received an object randomly selected from two alternatives as gift. In the ownership-by-choice scenario, participants were free to choose an object from two alternatives as gift. Objects with either positive or negative valence were included, under the assumption that they are evaluatively congruent or incongruent, respectively, with the self. In the mere-ownership scenario, it was predicted that the formation of self-object associations should be determined passively by pre-existing levels of self-object congruence, assuming the information processing of the alternatives should be at a minimal level. In the ownership-by-choice scenario, it was predicted that the formation of self-object associations should be determined by choice, assuming choice-related information processing creates self-object congruence for the chosen object. Consistent with the predictions, the findings show a moderating effect of object valence on self-object associations in the mere-ownership scenario, in that ownership effects on self-object associations were found for positive objects but not for negative objects. The findings also show an ownership-by-choice effect on self-object association for negative objects, indicating choice-induced changes in the representations of the chosen object. Additional findings indicate that such changes are caused by pre-choice information processing. The findings are discussed in light of the psychology of ownership, choice, and the self.

## Keywords

The self; Objects; Ownership; Choice; Associative network; The Unified Theory; Implicit social cognition.

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# 1 Theoretical Background

## 1.1 Ownership and self-object association

Ownership, one of the oldest forms of human-object relations, plays important roles in various domains of the society (e.g., economics, law). It has, however, received little research attention within the area of social psychology. After all, social psychologists care about the relations between humans, while ownership is about the relations between humans and objects. However, the ways people interact with objects has always been similar to the ways they interact with others. For example, people can assign human characteristics to non-human objects (Epley, Waytz, & Cacioppo, 2007), form impressions about objects (Zeithaml, 1988), develop trust and loyalty to objects (e.g., brand names, Chaudhuri & Holbrook, 2001), and get emotionally attached to objects (Frost & Hartl, 1996). The study of human-object relations, therefore, may reveal psychological mechanisms that can be applied to various topics in social psychology including attribution, impression formation, attitudes, and close-relationships.

One particular topic that is relevant to the psychology of ownership is the self. The idea that possessions contribute to the owner's self and identity can be traced back to James (1890), who defined a person's self as the "sum of things that the person calls his or hers" (p. 291). Influenced by the social-identity theory (Tajfel & Turner, 1986) and the symbolic self-completion theory (Wicklund & Gollwitzer, 1981), Belk (1988) argued that people's possessions are extensions of their self, as the possessions help them to maintain their identity, achieve a sense of continuity, and maintain a sense of the past.

Consumption as a way to expand one's possessions, therefore, has important self-regulation functions such as boosting the consumer's public self-image (Pettit & Sivanathan, 2011; Sivanathan & Pettit, 2010).

The research on the mere-ownership effect has shown that people tend to evaluate an owned object more positively than an equivalent but non-owned object (e.g., Beggan, 1992; Huang, Wang, & Shi, 2009). A similar effect can be seen in the name-letter effect, which indicates that individuals evaluate their own name letters more positively than the

other letters (Nuttin, 1985, 1987). The research on implicit egotism further indicates that the positive evaluation of one's name letters can transfer to other people, places, and even influence people's career choices (Jones, Pelham, Carvallo, & Mirenberg, 2004; Jones, Pelham, & Mirenberg, 2002; Pelham, Mirenberg, & Jones, 2002)<sup>1</sup>.

Beggan (1992) argued that the mere-ownership effect on evaluations of the owned objects is driven by self-enhancement motivation. A key factor, according to Beggan (1992), is the psychological association between the owner and the owned object, which allows the positive evaluations of an owned object to fulfill the goal of self-enhancement. Similarly, Greenwald and Banaji (1995) proposed that mental associations between a person's self and a concept allow for the automatic transference of positive valence from the self to the concept, which subsequently improves the person's positive feelings towards the concept.

According to the associative approach, ownership creates a mental association between the owner's self and a concept representing the owned object, and automatic valence transference from the self to the concept leads to increased liking of the owned object. In support of the notion of automatic valence transference, Gawronski, Bodenhausen, and Becker (2007) found that individuals' automatic evaluations of the self were positively correlated with their automatic evaluations of owned objects and uncorrelated with their automatic evaluations of non-owned objects. Walther and Trasselli (2003) found that positive or negative self-evaluations caused by bogus feedback were transferred to the evaluations of a fictitious person with whom participants were arbitrarily associated. Similarly, research on associative self-anchoring, (e.g., LeBel & Gawronski, 2007; Roth & Steffens, in press) has shown that individuals' automatic evaluations of the self were positively correlated with their automatic evaluations of ingroups and uncorrelated with their automatic evaluations of outgroups. Gramzow and Gaertner (2005) found explicit

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<sup>1</sup> Simonsohn (2011a, 2011b) re-analyzed the data of this study and concluded that the effects reported might be spurious and caused by "a combination of cohort, geographic, and ethnic confounds as well as reverse causality" (2011a, p. 1).

self-esteem predicted explicit ingroup favoritism. In these cases, the co-variations between the individuals' evaluations of the self and their evaluations of the owned objects, the associated persons, or the affiliated groups are considered as mediated by the mental associations between the individuals' selves and the respective concepts (Greenwald & Banaji, 1995; Walther & Trasselli, 2003).

Although mental associations between people's selves and other concepts are considered as a key mediator in attitudes, stereotypes, and self-esteem (Greenwald & Banaji, 1995), they have received little research attention (for an exception, see Gawronski et al., 2007). The present research aims to study the construct in the context of ownership. The goal of the present research is to investigate how ownership influences the formation of mental associations between owners' selves and the owned objects. Adopting an associative approach from the unified theory<sup>2</sup> (Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002), *self-object associations* are defined as facilitatory links between the node of self and that of an object in an associative network of social knowledge. Drawing on key premises of the unified theory, a model of self-object association formation in ownership scenarios is proposed. As will be elaborated in the next section, the key assumption of the model is that the formation of self-object associations is guided by two operating principles of the associative network, which are triggered by the levels of congruence or incongruence between the owners' active representations of the selves and of the owned objects.

## 1.2 Self-object association formation

### 1.2.1 Propositions vs. associations

Propositions are beliefs about the state of affairs in the world (De Houwer, 2014).

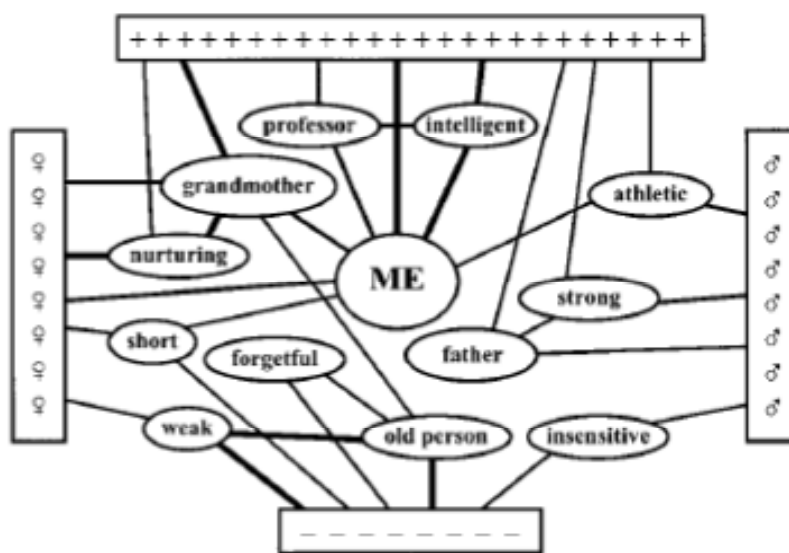
Propositions contain information about relations between concepts (Lagnado, Waldmann, Hagmayer, & Sloman, 2007), are subject to syllogistic rules and logical principles, and

---

<sup>2</sup> The full name is the unified theory of implicit attitudes, stereotypes, self-esteem, and self-concept. The term "unified" is used, as the theory provides an overarching framework that explains these different phenomena in social psychology.

can be judged as true or false (Gawronski & Bodenhausen, 2006). It is postulated that when people learn about their prospective or factual ownership of certain objects, their perceptions of the ownership scenarios lead to logical inferences of ownership propositions, such as “I will own this object” or “this object is mine”.

In contrast, associations are facilitatory links between nodes that represent concepts (Greenwald et al., 2002). Associations do not contain relation information or truth value, do not follow logical principles, and instead are subject to the principle of automatic spread of activation (Greenwald et al., 2002; Gawronski & Bodenhausen, 2006). The activation of one concept in an association should automatically lead to the activation of the other concept, regardless of the truth value of the proposition that can be inferred from the association (Gawronski & Bodenhausen, 2006).



**Figure 1.1. A sample structure in the associative network of social knowledge. Adapted from “A Unified Theory of Implicit Attitudes, Stereotypes, Self-esteem, and Self-concept,” by A. G. Greenwald, M. R. Banaji, L. A. Rudman, S. D. Farnham, B. A. Nosek, & D. S. Mellott, 2002, *Psychological Review*, 109, p. 5. Copyright 2002 by the American Psychological Association.**

According to the unified theory (Greenwald et al., 2002), mental associations are formed and stored in a large associative network of social knowledge, in which social



psychological concepts (e.g., the self, others, social groups, and traits) are represented as interconnected nodes. Associations between nodes allow for the automatic spread of activation between different concepts, and they differ in strength in terms of the potential of a node to activate another node. As a key configuration of the associative network, Greenwald et al. suggested that the node representing “me” is located at the center of the person’s associative network, as depicted in Figure 1.1, and has a large number of associations with other concepts such as traits (e.g., strong) and roles (e.g., father). Moreover, the associative network contains the so-called “bipolar-opposite nodes” (p. 6), which represent pairs of categorical or evaluative concepts that are semantically or affectively opposite to each other. Two examples, as depicted in Figure 1.1, are positive and negative valence and the genders of male and female.

### 1.2.2 Mediators of self-object associations

According to Greenwald and Banaji (1995), the associations between a person’s self and other social entities can be naturally mediated or forced. Naturally-mediated associations are formed on the basis of pre-existing similarities between concepts. In implicit egotism research (Jones et al., 2004; Jones et al., 2002; Pelham et al., 2002), for example, the associations between people and other people, places, or jobs are naturally mediated by people’s name letters (e.g., the letter d in Daniel and dentist) or birth dates (e.g., a stranger wearing a jersey numbered as one’s date of birth). Beggan (1992) suggested a similar mechanism, that the psychological association between an owner and an owned object can be mediated by their shared features such as the person’s date of birth. Similarity-attraction effects indicate that people develop positive attitudes towards others that are similar to them in economic status (Byrne, Clore, & Worchel, 1966), self-concept (Griffitt, 1966), attitudes, values, and beliefs (Berscheid, 1994), and personality (Klohn & Luo, 2003). The improved positive attitudes might be the outcomes of self-other associations (e.g., through automatic valence transference) that are mediated by the perceived similarities between people’s selves and other people.

Forced self-other associations, in contrast, are formed due to situational pressures on the associative network. The pressures can come from different types of sources. The co-occurrence of two concepts such as the conditioned stimulus and the unconditioned

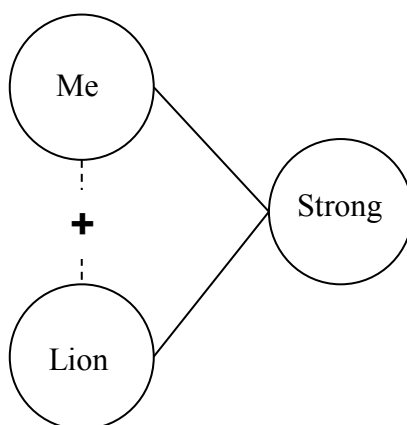
stimulus in evaluative conditioning effects (for a review, see De Houwer, Thomas, & Baeyens, 2001) is a type of source. In a study by Perkins and Forehand (2012), a single co-occurrence of a fictional brand name and logos near participants' Facebook pages was found sufficient in creating self-brand associations for the participants. Another type of source of situational pressures is approaching behaviours. Research by Kawakami and colleagues (e.g., Kawakami, Phills, Steele, & Dovidio, 2007; Kawakami, Steele, Cifa, Phills, & Dovidio, 2008) indicates that approach training, which involves pulling a joystick toward oneself when presented with certain stimuli (e.g., pictures of minority members, math-related concepts), can improve implicit racial attitudes or women's attitudes toward math. Phills, Kawakami, Tabi, Nadolny, and Inzlicht (2011) further found that the approach training with Black faces as stimuli had led to enhanced self-Blacks associations for the participants.

Propositions that are considered as true also create pressures on the associative network for the formation of correspondent associations between the concepts included in the propositions. An example is given by Greenwald et al. (2002), in which a person's cousin was married to a former criminal. In this case, the proposition about the marriage creates pressures, forcing a new association between the person's cousin and the former criminal to which the cousin is married.

### 1.2.3 From ownership propositions to self-object associations

Drawing on the previous analysis, it can be argued that ownership propositions inferred from ownership scenarios (e.g., "I own this object") create pressures on the owner's associative network to form an association between the owner's self and the owned object. More importantly, it is further argued that the pressures from ownership propositions do not necessarily lead to the formation of the associations. The actual formation of self-object associations is the function of the associative network by following two principles on the basis of the relations between the owner's representation of self and that of the owned object. This notion will be elaborated in the following.

The relation between a representation of the self and that of an object can be defined as varying along a continuum from *self-object congruence* to *self-object incongruence*<sup>3</sup>. Self-object congruence embodies the extent to which the two representations are similar. If representations are defined as active sets of nodes, then the degree of congruence between the representation of the self and that of an object will be contingent to the amount of shared nodes between the two representations. The more nodes shared between the two representations, the higher the level of self-object congruence. Figure 1.2 depicts an associative structure with self-object congruence, as the two nodes: “me” and “lion” share a common node of “strong”.



**Figure 1.2. An associative structure with self-object congruence, which facilitates the formation of an association between the node representing the self (“Me”) and the node representing the concept of the object (“Lion”)**

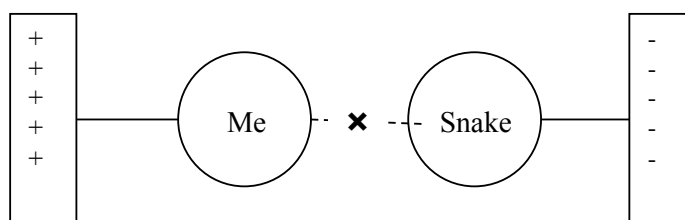
Self-object incongruence, in contrast, embodies the extent to which the two representations are different or, in the language of the unified theory (Greenwald et al., 2002), bipolar-opposing. If, again, representations are defined as active sets of nodes, then the degree of incongruence between the representation of the self and that of an object will be contingent to the degree to which the nodes of each representation are

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<sup>3</sup> Self-object congruence and incongruence are the ends of a continuum. The middle point of the continuum should be self-object irrelevance.

associated to each side of a pair of bipolar-opposing nodes. For example, if the representation of the self includes the node of positivity and the representation of an object includes the node of negativity, then this specific associative structure can be described as indicating self-object incongruence. Figure 1.3 depicts such an associative structure with self-object incongruence.

Drawing on Wheeler, DeMarree, and Petty's (2007) active-self model, the distinction between the active representation of a concept (e.g., the self) and the chronic representation of the concept is made in the current model. The chronic representation of the self, for example, includes all nodes associated with the node of self (see Figure 1.1, for example). An active representation of the self, accordingly, is a subset of chronic representation of the self that is currently accessible and may only include a few nodes that are currently accessible (e.g., athletic). The same example can be made for an active representation of an object, which is a subset of the chronic representation of the object. In the current model, the levels of self-object congruence or incongruence are determined by active, not chronic, representations of the self and of the object.



**Figure 1.3. An associative structure with self-object incongruence, which inhibits the formation of an association between the node representing the self (“Me”) and the node representing the concept of the object (“Snake”)**

Now that the antecedents of self-object association formation have been defined, it's necessary to specify the processes of self-object association formation. It is assumed that self-object association formation follows two operational principles of the associative network (Greenwald et al., 2002), which translates self-object congruence and incongruence into effects on self-object association formation.

The first principle of *balance-congruity* states that the associative structure in which two unassociated concepts are both associated with the same node should facilitate the formation of a new association between the two concepts. From this principle and the previous definition of self-object congruence, it can be deduced that self-object congruence will lead to a facilitation effect on the formation of self-object association, as depicted by the “+” sign in Figure 1.2. For an example, if a person who views him or herself as intelligent is given a gift that has a connotation of intelligence, such as a Rubic cube, then the self-object congruence caused by the shared concept of intelligence between the person’s representation of the self and that of the Rubic cube should facilitate the formation of a self-object association between the person and the Rubic cube.

The second principle of *imbalance-dissonance*<sup>4</sup> states that, the associative network resists forming a new association that would result in a node being associated to two bipolar-opposite nodes. From this principle and the definition of self-object incongruence, it can be deduced that self-object incongruence will lead to an inhibition effect on the formation of self-object association, as depicted by the “x” sign in Figure 1.3. For an example, if a person who views him or herself as unathletic is given a gift that has the connotation of athleticism, such as a set of dumb bells, then the self-object incongruence caused by the association between the self and unathletic and the association between the gift and athletic should inhibit the formation of self-object association between the person and the dumb bells.

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<sup>4</sup> The term “dissonance” here carries different meanings from that in classic cognitive dissonance theory. Although not specified in Greenwald et al. (2002), it can be speculated that it refers to the resistance force of the associative network against “imbalanced” associative structures. In the classic cognitive dissonance model, the term dissonance refers to the aversive feeling aroused by the inconsistency between cognitive components, which drives for a change in these cognitive components to restore balance and reduce the aversive feeling. Therefore, the current “dissonance” and cognitive dissonance are similar in that both lead to driving forces that restore balance either to the associative network or to the belief system, respectively.

### 1.2.4 Summary

The current model involves two steps. In the first step, people's perceptions of ownership lead to ownership propositions, which put pressure on people's associative networks to form self-object associations. In the second step, the formation of associations is further facilitated or inhibited, depending on the levels of congruence or incongruence, respectively, between the active representation of the self and that of the object.

According to the current model, to predict the effect of ownership on self-object associations, it is necessary to understand the levels of self-object congruence and incongruence in ownership scenarios. First, pre-existing levels of self-object congruence and incongruence can be determined, if both the chronic representation of the self and those of the objects contain certain highly accessible features that can be automatically activated. Attitudes, or feelings of pleasantness or unpleasantness towards certain stimuli, are highly accessible and can be automatically activated (Bargh, Chaiken, Raymond, & Hymes, 1996; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Drawing on (a) individuals tend to have an automatic positive feeling towards the self (Greenwald et al., 2002), and (b) objects of positive or negative valence can automatically activate pleasant or unpleasant feelings, respectively, it is assumed that positive objects have pre-existing levels of evaluative self-object congruence, while negative objects have certain pre-existing levels of evaluative self-object incongruence.

Secondly, according to Wheeler et al. (2007), both the active representation of the self and that of the object can change, either by changing the active subset of chronic representations of the self and the object or by introducing new materials into the active representations of the self and the object. As will be elaborated in the next section, it is assumed that information processing during the choice between multiple objects can lead to changes in active representations in a way that increases the level of self-object congruence for the chosen object, and therefore facilitate the formation of a self-object association for the chosen object. Importantly, this assumed process should occur regardless of the pre-existing levels of self-object congruence of the chosen object.

## 1.3 Ownership scenarios

Two types of ownership scenarios: *mere-ownership* and *ownership-by-choice*, are selected to test the above assumptions. The key difference between the two scenarios is the level of information processing involved in each scenario. In a mere-ownership scenario (Beggan, 1992), a person is offered a gift that is randomly selected from several alternatives without the freedom to choose. Due to the lack of choice and control over the outcome of choice, all other factors being equal, prospective owners in the mere-ownership scenario should have a minimal level of motivation to process the alternative objects. Therefore, the mere-ownership scenario should involve a minimal level of cognitive processing of the alternative objects.

In an ownership-by-choice scenario, in contrast, a person is free to choose a gift from the alternatives. With the introduction of choice, this scenario involves an elevated sense of personal control and enhanced levels of motivation to process the alternatives (Tafarodi, Mehranvar, Panton, & Milne, 2002; Chan, Karbowski, Monty, & Perlmutter, 1986).

Therefore, a relatively high level of cognitive processing of the alternative objects should happen in the ownership-by-choice scenario. Previous research (for a review, see Brownstein, 2003) has documented two common types of choice-related information processing: *pre-choice processing* and *post-choice processing*. The features of each type of processing and their potential effects on the active representations of the alternative objects will be elaborated in the remainder of this section.

### 1.3.1 Pre-choice processing

During pre-choice processing—information processing that occurs before the choice maker makes the decision—individuals evaluate and differentiate between choice alternatives in order to develop preferences (Brownstein, 2003; Busemeyer & Johnson, 2004; Svenson, 1992; Thurstone, 1927). According to Tversky's (1972) elimination-by-aspect model, pre-choice processing involves the examination and evaluation of choice alternatives along a set of aspects that the choice makers consider as important. Each time, one aspect is selected and the alternatives that do not include the positive feature on

the selected aspect are eliminated. This process repeats with a new aspect, and goes on until there is a favorite alternative remaining.

Applying this process to the current model, it can be postulated that pre-choice processing leads to changes in the active representations of the choice alternatives, so that the representation of the preferred alternative contains more overlapping features with the self than the representations of the rejected alternatives. Consequently, the preferred alternative should have a higher level of self-object congruence than the rejected alternatives. For example, imagine a person looking to buy a car faces the choice between a Toyota and a Mazda. In order to make the choice, the person first needs to contemplate on his or her own preferences. If the person determines that he or she values the feature of “fun to drive”, he or she will need to process information about the cars to determine which one has an advantage in this feature. If the Mazda wins in this regard, its advantage in “fun to drive” over the Toyota will lead to a higher level of self-object congruence (for this person) in the Mazda than that in the Toyota.

### 1.3.2 Post-choice processing

Post-choice processing involves post-choice re-evaluations of the alternative objects or selective exposure to choice-confirming information that are motivated by the need to justify the choice and reduce post-choice dissonance (Brehm, 1956; Festinger, 1957, 1964). Festinger suggested that after a choice, people tend to experience the aversive feeling of post-choice dissonance, due to the cognitive inconsistency between three cognitive elements: (a) the positive features of the rejected alternatives, (b) the negative features of the chosen alternative, and (c) the commitment to the chosen alternative. In order to reduce dissonance, people may further bolster their preferences of the chosen alternative over the rejected alternatives (for a review, see Chen & Risen, 2010), or they can selectively process information that confirms their choices (e.g., information about the positive features of the chosen object and negative features of the rejected object). Specifically, they may avoid information that conflicts with their choices (e.g., information about the negative features of the chosen object and positive features of the rejected object, for a review, Jonas, Schulz-Hardt, Frey, & Thelen, 2001).



It is unclear, however, how post-choice processing influences self-object associations. Drawing on Gawronski and Strack's (2004) finding that cognitive dissonance influences explicit but not automatic evaluations, it is possible that motivated re-evaluations of the alternative objects reduce dissonance without changing their underlying representations, which should subsequently lead to no effect on self-object associations. Selective exposure to choice-confirming information, on the other hand, may change the representations of the alternative objects by activating additional features in the chosen object over and above the ones that have already been activated during pre-choice processing. For example, if the person who has chosen the Mazda is exposed to additional information about the Mazda after the choice, he or she may find additional positive features of the car (e.g., fun to drive), which would further enhance the already formed self-object association between the person and the Mazda. When additional information is unavailable, however, it is unclear whether or not individuals engage in active search for additional positive features within the existing representations of the chosen alternative.

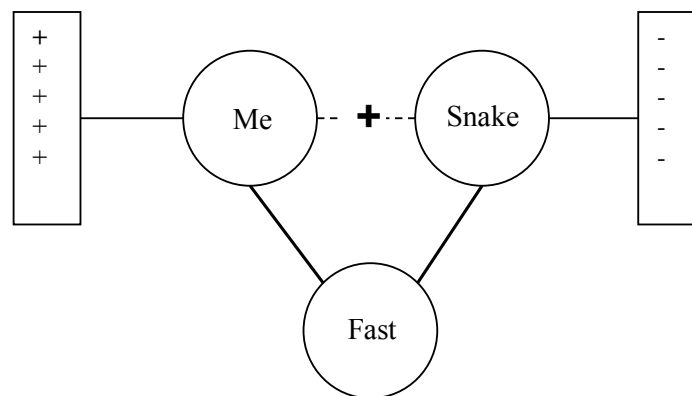
In sum, it is assumed that in the ownership-by-choice scenario, choice should facilitate the formation of self-object association for the owned object by changing the representation of the chosen object and enhancing its level of self-object congruence.

## 1.4 Predictions and overview of studies

Drawing on the previous analyses, predictions about boundary conditions for the formation of self-object associations in each ownership scenario can be made. First, it is predicted that in the mere-ownership scenario where information processing is minimal, the formation of self-object associations should be determined by pre-existing levels of congruence and incongruence between the representation of the self and that of the owned object. Using object valence as a proxy of self-object congruence and incongruence along the valence dimension, it is predicted that the formation of self-object associations in the mere-ownership scenario, indicated by an ownership effect on self-object associations, should be facilitated when the alternatives are positive objects and inhibited when the alternatives are negative objects.

Second, the moderating effects of self-object congruence/incongruence in the mere-ownership scenario should not apply to the ownership-by-choice scenario. Instead, for objects with pre-existing levels of incongruence with the owner's self, information processing during choice can change their representations and increase the levels of self-object congruence. Therefore, it is predicted that the chosen object should have a higher level of self-object congruence than the rejected objects regardless of their levels of self-object congruence prior to the choice.

For example, if a person is provided a choice between the picture of a snake and that of a spider, both of which the person dislikes and therefore incongruent with the person's self. After processing the two objects, the person decides to choose snake as he finds a feature that he likes about snakes, that they are fast. The feature of "fast" becomes included in the active representation of snakes, and creates a certain level of self-object congruence for snakes which may further facilitate the formation of self-object association for snakes. This process is illustrated in Figure 1.4.



**Figure 1.4. The activation of self-object congruence (mediated by the feature of “Fast”) in the representation of an object (“Snake”) otherwise incongruent with the self. The self-object congruence facilitates the formation of a self-object association.**

Accordingly, it is predicted that for negative objects, the formation of self-object associations in ownership scenarios should be moderated by choice. In the mere-ownership scenario, there should be no ownership effect on self-object associations for negative objects. In the ownership-by-choice scenario where owners have a choice,

however, there should be an ownership effect on self-object associations for negative objects.

To empirically test the two predictions, five experimental studies are reported in Chapter 2. All experiments involve scenarios in which participants had real ownership of a novel object. Study 1 was designed to test the predicted moderating effects of object valence in the mere-ownership scenario. Study 2 tested the predicted moderating effect of choice on self-object associations for negative objects. Study 3 was designed to address an issue with the free-choice paradigm and to rule out the possibility that the formation of self-object associations is due to pre-existing differences between choice alternatives in the levels of self-object congruence. Study 4 and Study 5 were designed to test the effects of various factors pertaining to the degrees of pre-and post-choice processing on self-object associations.

## 2 Empirical Studies

For readers' convenience, several key terms are used throughout the next chapters to describe certain patterns of results. First, an *ownership effect* is defined as the advantage of an owned object over an otherwise equivalent non-owned object in the variable of interest (e.g., self-object associations, explicit evaluations). Thereby, an ownership effect on self-object associations represents the advantage of an owned object over a non-owned object in the strength of their associations with the self of the owners. The ownership effects found in the mere-ownership scenario are further labeled as *mere-ownership effects*, while the ownership effects found in the ownership-by-choice scenario are labeled as *ownership-by-choice effects*.

### 2.1 Study 1: Object valence and mere-ownership

The main goal of Study 1 was to test the first prediction outlined in Chapter 1 (p. 13): In the mere-ownership scenario, self-object association formation should be moderated by pre-existing levels of self-object congruence or incongruence. To test this hypothesis, *object valence*—the valence of the two alternative objects—was manipulated as either positive or negative. A positive object is assumed to be congruent with the self, because their representations share a common node of positivity; a negative object, in contrast, is assumed to be incongruent with the self, because the object's representation contains a link to the node representing negativity, which is bipolar-opposite to the node representing positivity that is part of the representation of the self. According to the theoretical framework outlined in Chapter 1, the formation of self-object association should be facilitated by self-object congruence and inhibited by self-object incongruence. Assuming that in the mere-ownership scenario the levels of self-object congruence and incongruence remain unchanged, it was predicted that a mere-ownership effect on self-object associations should be found when the alternative objects are of positive valence, but not when the alternative objects are of negative valence.

In accordance with the current conceptualization of self-object associations, the studies used an indirect measure of self-object associations based on the sequential priming paradigm (Fazio, Jackson, Dunton, & Williams, 1995; Gawronski et al., 2007), which is

commonly assumed to measure the strength of mental associations. Moreover, in this study, automatic evaluations of the objects were assessed with a similar measure based on the notion of affective priming. Assuming that (a) self-object associations allow for the automatic transfer of valence from the owner's self to the owned object, and (b) the transfer of valence leads to an improved positive automatic evaluation towards the owned object, it was predicted that the mere-ownership effects on automatic evaluations should also be moderated by object valence.

## 2.1.1 Method

### 2.1.1.1 Participants and design

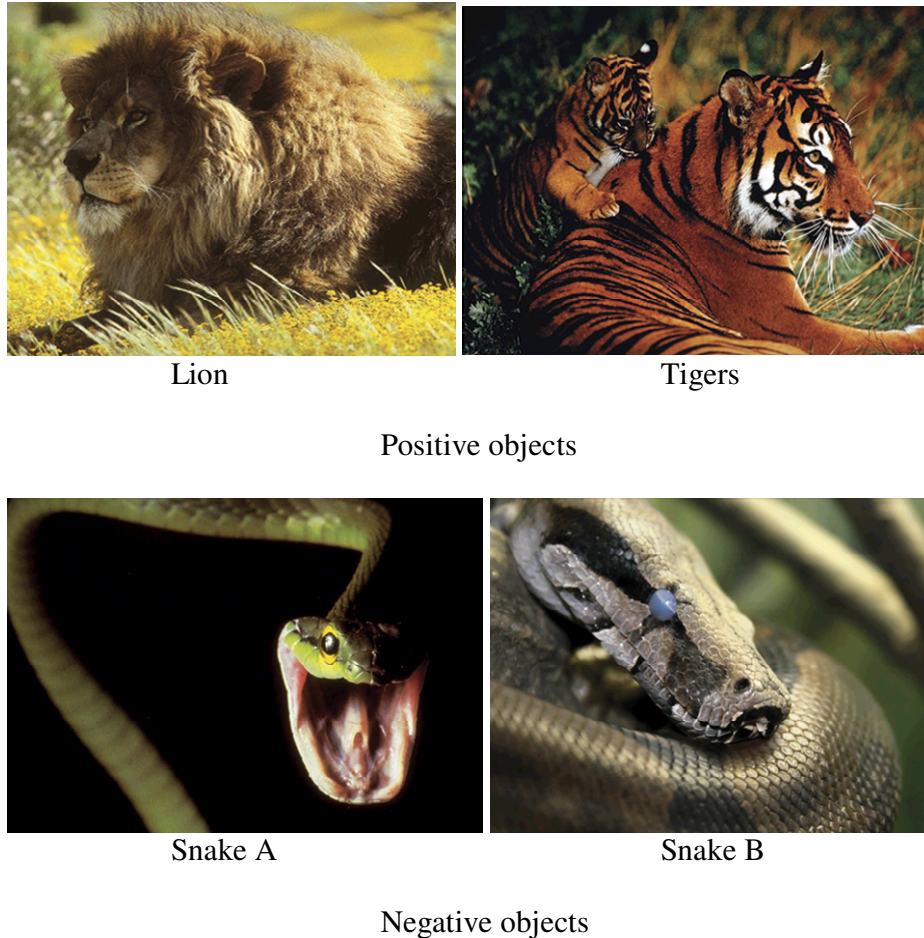
A total of 156 undergraduate students (124 women and 32 men; mean age 19.03 years) from the subject pool of the University of Western Ontario participated for research credit. One participant's data were incomplete due to a computer malfunction.

The study used a 2 (Object Valence: positive vs. negative, between-Ss)  $\times$  2 (Object Status: owned vs. non-owned, within-Ss)  $\times$  2 (Order of Measures: self-object associations measure first vs. automatic evaluations measure first, between-Ss) mixed-model design. The two dependent variables were self-object associations and automatic object evaluations.

### 2.1.1.2 The objects

The objects used in the current research were adapted from the International Affective Picture System (IAPS, Lang, Bradley, & Cuthbert, 2008), which provides a pool of pictures that vary widely in terms of content and the range of established empirical pleasantness ratings. The standard ratings of pleasantness were provided by approximately 100 college students (half women) taking an introductory psychology course, a sample that is highly comparable to the samples in the present research. The ratings were made on a scale from 1 (*very unpleasant*) to 9 (*very pleasant*). To keep the cover story plausible, pictures with moderately unpleasant ratings were selected for the negative objects conditions. As depicted in Figure 2.1, the two pictures selected for the positive objects condition were a picture of a lion (No. 1720,  $M = 6.79$ ) and a picture of

two tigers (No. 1721,  $M = 7.30$ ); the two pictures selected for the negative objects condition were two snake pictures, here and after called *Snake A* (No. 1050,  $M = 3.46$ ) and *Snake B* (No. 1033,  $M = 3.87$ ). Pictures in the same condition have (a) similar content, (b) similar levels of pleasantness ratings, and (c) different visual features (e.g., color, contour) so that they can be distinguished easily by the participants.



**Figure 2.1. The positive and negative objects used in the current research.**

### 2.1.1.3 Mere-ownership task

Participants were told that they would receive a color print of a picture from the "Nature and Wild Life" collection as a special gratitude for their participation. They were told that two pictures would be randomly selected from a pool of many pictures and then a computer program would randomly select a picture for them. The two positive or negative objects, depending on the condition, were then presented side by side on the

computer screen. Participants were asked to press the space bar to start the random selection. Then, as a visualization of the random selection process, a yellow frame appeared around one of the two pictures and started to “jump” from one to the other quickly several times before slowing down and settling on one of the pictures. Participants were then told that the picture in the yellow frame was the one that was selected for them. After 6 seconds of display, the pictures disappeared and participants were told to find the experimenter.

Upon request, the experimenter returned to the testing room and asked the participants which picture was selected. The experimenter made notes of the participants’ responses and told the participants that a print of the chosen picture was reserved for them for pick-up after the study. The experimenter then pressed a key on the keyboard to return to the previous screen. Unknown to the participants, the experimenter checked whether the participants’ responses were consistent with the actual outcomes of the random selection displayed on the screen. The responses of all participants matched the actual outcomes of random selection.

Although the program’s choice appeared to be random (due to the animation of the yellow frame), the outcome of the choice for each participant was indeed predetermined according to the condition to which the participant was assigned. The number of participants receiving each specific picture was kept equal across conditions.

#### 2.1.1.4 Measures

Participants were asked to complete two priming tasks: a sequential priming task as the measure of self-object associations (Gawronski et al., 2007) and an affective priming task as the measure of automatic evaluations (Fazio et al., 1995; Gawronski et al., 2007). The order of the two measures was counter-balanced between participants.

On each trial of the sequential priming task, participants were presented with a blank screen for 500ms, a fixation cross for 200ms, a supraliminal presentation of a prime picture for 200ms, and a target word that remained on the screen until a response was made (SOA = 200ms). They were asked to press a key, *A* or *Numpad 5*, to categorize

each target word as either related to “self” or related to “other” as quickly as possible. The target words related to “self” were *self, me, I, mine, and my*, whereas the target words related to “other” were *other, them, their, they, and it*. The prime pictures were the two positive or negative objects which participants encountered during the mere-ownership task and an additional neutral grey square which was included as a baseline prime. The pictures were presented in the resolution of approximately 430 × 300 pixels. Each picture was presented four times with each of the ten target words, summing up to a total of 120 trials.

The affective priming task used the same procedural parameters as the sequential priming task, except that participants were asked to categorize each target word, selected from a different set of 40 target words, as either “positive” or “negative” as quickly as possible. The 20 positive target words were *paradise, summer, harmony, freedom, honesty, honor, smile, cheer, pleasure, heaven, friend, sunrise, love, relaxation, peace, holiday, rainbow, luck, miracle, and diamond*, whereas the 20 negative target words were *evil, sickness, vomit, bomb, murder, abuse, prison, crash, assault, cancer, pain, accident, grief, tragedy, poverty, pollution, virus, disaster, hatred, and terror*. Each of the three prime pictures was presented once with each target word, summing up to a total of 120 trials. Response latencies and errors were recorded during both tasks.

Following the logic of the priming paradigm (Fazio et al. 1995), higher levels of self-object associations for an object are indicated by shorter response latencies on trials with prime-target combinations involving the object and self-related target words and longer response latencies on trials with prime target combinations involving the object and other-related target words. Similarly, more positive automatic evaluations are indicated by shorter response latencies on trials with prime-target combinations involving the object and positive target words and longer response latencies on trials with prime-target combinations involving the object and negative target words.

#### 2.1.1.5 Procedure

Participants were seated in 5 separate computer cells in a large room. After signing informed consent forms, they were randomly assigned to one of the four conditions



defined by Object Valence (positive vs. negative) and Order of Measures (self-object associations first vs. automatic evaluation first). They were asked to complete the mere-ownership task and the measures of self-object associations and automatic evaluation in counter-balanced order. At the end of the study, all participants were fully debriefed and received a 4-inch  $\times$  6-inch print of the selected picture.

## 2.1.2 Results

### 2.1.2.1 Self-object associations

Response latency data from the sequential priming task were processed following the procedure by Gawronski et al. (2007): latencies from incorrect responses (5.1%) were eliminated, then outlier latencies higher than 1500ms (2.9% of the correct responses) were truncated. The processed response latencies were then averaged for each participant according to the 6 prime-target combinations, involving the 3 types of prime stimuli (owned object, non-owned object, gray square) and 2 target types (self-related words, other-related words). Four baseline-corrected priming scores were calculated by subtracting the mean latencies of each of the four prime-target combinations involving a given object and a particular kind of target stimulus (i.e., owned-object/self-related, owned-object/other-related, non-owned object/self-related, non-owned object/other-related) from the mean latencies on the corresponding baseline trials (gray square/self-related, gray square/other-related).<sup>5</sup> Preliminary analyses indicated no object-specific effects: The results reported in the following were not affected by the specific object that participants received during the study.

The four baseline-corrected priming scores were submitted to a 2 (Prime: owned vs. non-owned picture, within-Ss)  $\times$  2 (Target: words related to self vs. words related to other, within-Ss)  $\times$  2 (Objects Valence: positive vs. negative, between-Ss)  $\times$  2 (Order of Measurement: affective priming first vs. sequential priming first, between-Ss) mixed-

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<sup>5</sup> The same analyses on log-transformed response latencies produced similar results for both self-object associations and automatic evaluations. Results of the analyses using original response latencies were reported to keep it consistent between the reported means and the actual analyses.

model ANOVA. The analysis revealed a marginally significant three-way interaction between Prime, Target, and Object Valence,  $F(1, 151) = 3.48, p = .064, \eta_p^2 = .023$ . No other main or interaction effects were found to be significant, all  $ps > .05$ . The means and standard deviations for the 3-way interaction are shown in Table 2.1.

**Table 2.1. Mean baseline corrected response latencies from the self-other priming task in Study 1**

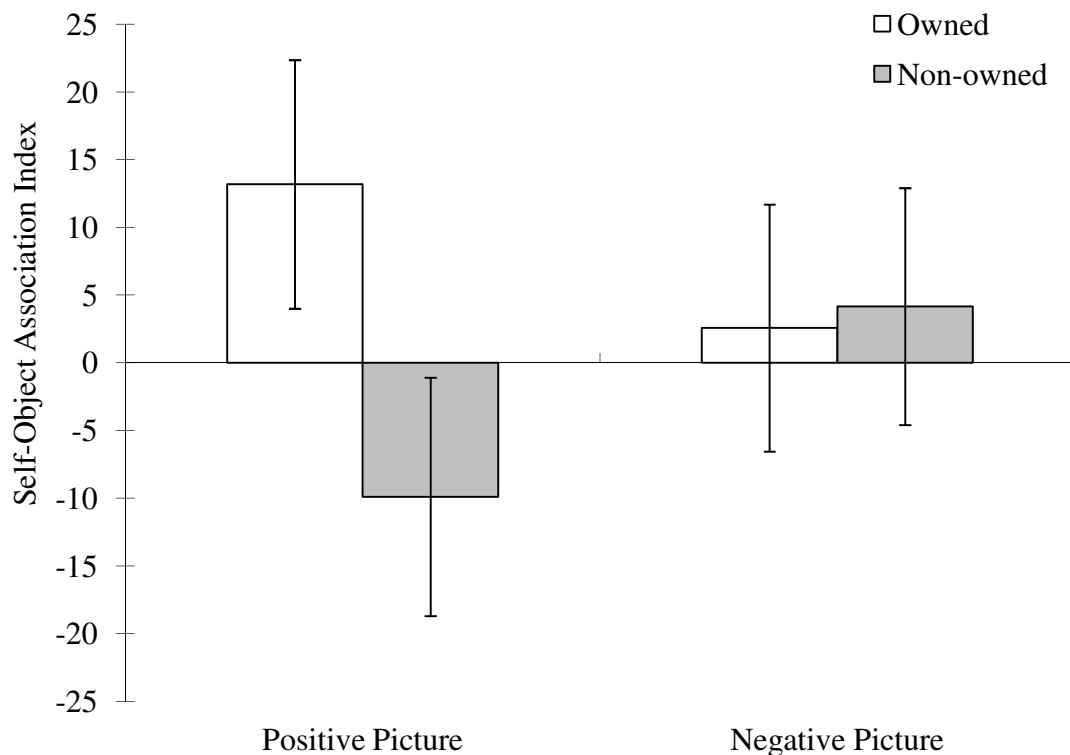
Target	Prime			
	Positive Pictures		Negative Pictures	
	Owned	Non-owned	Owned	Non-owned
Self-related	-5.64(49.09)	-13.07(49.16)	-16.66(49.11)	-16.05(49.18)
Other-related	-18.82(54.83)	-3.17(56.56)	-19.23(54.85)	-20.21(56.59)

$N = 155$ . Numbers in parentheses are standard deviations.

The three-way interaction suggests that the size of sequential priming effects was different between the two object valence conditions. In order to specify this difference, two indices of self-object associations, one for the owned object and one for the non-owned object, were calculated from the four baseline-corrected priming scores by subtracting the baseline-corrected priming scores for self-related target words from the baseline-corrected priming scores for other-related target words for each of the two objects (i.e., owned vs. non-owned). Higher values on each index indicate higher levels of self-object associations for the relevant object.

These two indices were submitted to a 2 (Object Status: owned vs. non-owned, within-Ss)  $\times$  2 (Objects Valence: positive vs. negative, between-Ss)  $\times$  2 (Order of Measurement: affective priming first vs. sequential priming first, between-Ss) mixed ANOVA analysis, which generated a significant 2-way interaction between Object Status and Object Valence that was statistically the same as the 3-way interaction between Prime, Target, and Object Valence in the previous ANOVA analysis. Tests of simple effects of Object

Status (owned vs. non-owned, within Ss) at different levels of Objects Valence (positive vs. negative, between Ss) further indicate that in the positive objects condition, self-object associations were significantly stronger for the owned object ( $M = 13.18$ ) than for the non-owned object ( $M = -9.89$ ),  $F(1,151) = 6.06$ ,  $p = .015$ ,  $\eta_p^2 = .039$ . In the negative objects condition, however, self-object associations did not significantly differ for the owned object ( $M = 2.57$ ) and the non-owned object ( $M = 4.16$ ),  $F(1,151) = 0.029$ ,  $p = .86$ ,  $\eta_p^2 < .001$ . The results are depicted in Figure 2.2.



**Figure 2.2. Self-object associations as a function of mere-ownership and object valence in Study 1. Error bars represent standard errors.**

### 2.1.2.2 Automatic Evaluations

The response latency data from the affective priming task were processed in the same way the sequential priming task data were processed. Latencies from incorrect responses (3.2%) were eliminated and outlier latencies higher than 1500ms (2.6% of the correct

responses) were truncated. Response latencies were averaged for each participant according to 6 prime-target combinations, involving the 3 types of primes (owned object, non-owned object, gray square) and the 2 types of targets (positive, negative). Four baseline-corrected priming scores were calculated by subtracting the mean latencies of each of the four prime-target combinations involving a given object and a particular kind of target stimulus (i.e., owned-object/positive, owned-object/negative, non-owned object/positive, non-owned object/negative) from the mean latencies on the corresponding baseline trials (gray square/positive, gray square/negative).

The four baseline-corrected priming scores were submitted to a 2 (Prime: owned vs. non-owned picture, within-Ss)  $\times$  2 (Target: positive words vs. negative words, within-Ss)  $\times$  2 (Objects Valence: positive vs. negative, between-Ss)  $\times$  2 (Order of Measurement: affective priming first vs. sequential priming first, between-Ss) mixed-model ANOVA. The analysis revealed a significant three-way interaction between Prime, Target, and Object Valence,  $F(1, 151) = 5.49, p = .020, \eta_p^2 = .035$ . No other effects were significant, all  $ps > .05$ . The means and standard deviations for the three-way interaction are shown in Table 2.2.

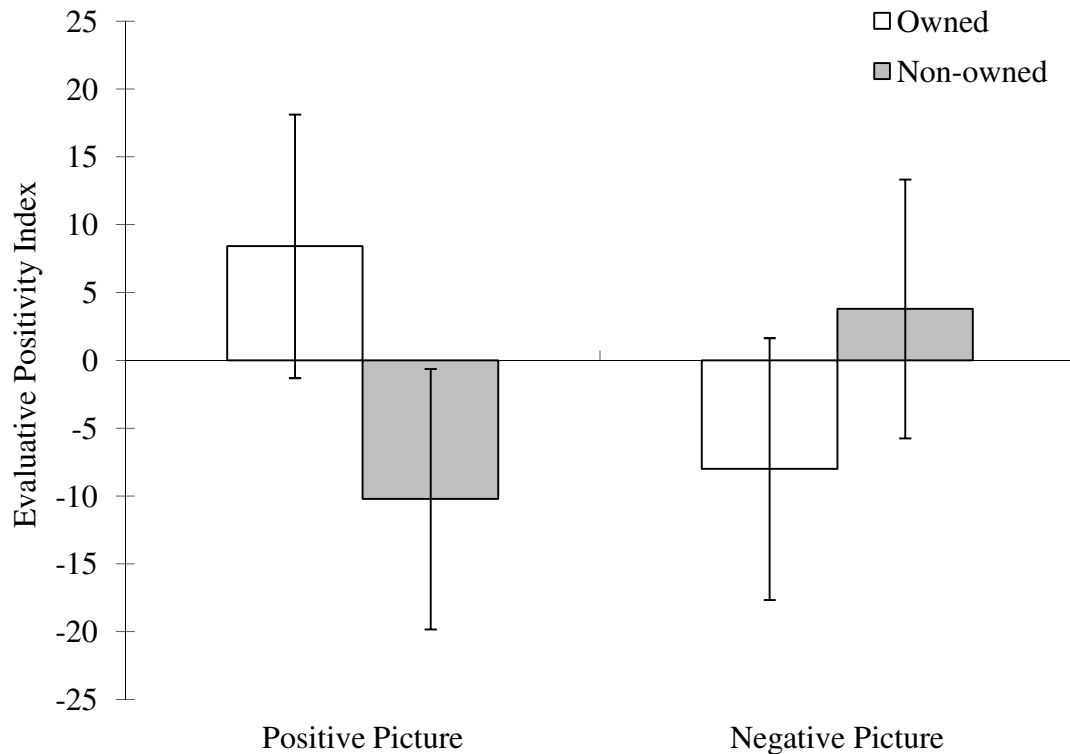
**Table 2.2. Mean baseline corrected response latencies from the affective priming task in Study 1**

Target	Prime			
	Positive Pictures		Negative Pictures	
	Owne	Non-owned	Owne	Non-owned
Positive	-2.08(63.87)	-15.29(62.98)	-13.44(63.90)	-9.24(63.01)
Negative	-10.49(54.31)	-5.07(49.55)	-5.44(54.34)	-13.04(49.58)

N = 155. Numbers in parentheses are standard deviations.

The three-way interaction again indicates that the size of affective priming effects differed between the two Object Valence conditions. In order to specify this difference,

two positivity indices, one for owned object and one for non-owned object, were calculated from the four baseline-corrected priming scores by subtracting the baseline-corrected priming scores for positive target words from the baseline-corrected priming scores for negative target words for each of the two objects (i.e., owned vs. non-owned). Higher values on each index indicate higher levels of positivity in the automatic evaluation of the relevant object.



**Figure 2.3. Automatic evaluations of objects as a function of mere-ownership and object valence in Study 1. Error bars represent standard errors.**

These two indices were submitted to a 2 (Object Status: owned vs. non-owned, within-Ss)  $\times$  2 (Objects Valence: positive vs. negative, between-Ss)  $\times$  2 (Order of Measurement: affective priming first vs. sequential priming first, between-Ss) mixed ANOVA analysis, which again generated a significant 2-way interaction between Object Status and Object Valence that was statistically the same as the 3-way interaction between Prime, Target, and Object Valence in the previous ANOVA analysis. Tests of simple effects of Object

Status (owned vs. non-owned, within Ss) at different levels of Objects Valence (positive vs. negative, between Ss) indicate that, in the positive objects condition, automatic evaluations were significantly more positive for the owned object ( $M = 8.41$ ) than the non-owned object ( $M = -10.22$ ),  $F(1,151) = 4.09$ ,  $p = .045$ ,  $\eta_p^2 = .026$ . In the negative objects condition, however, automatic evaluations did not significantly differ for the owned object ( $M = -8.00$ ) and non-owned object ( $M = 3.80$ ),  $F(1,151) = 1.66$ ,  $p = .20$ ,  $\eta_p^2 = .011$ . The results are depicted in Figure 2.3.

### 2.1.3 Discussion

Study 1 was designed to test the moderating effects of pre-existing levels of self-object congruence and incongruence on the formation of self-object associations in the mere-ownership scenario. Consistent with the prediction of the present research, the results indicate that the mere-ownership effects on self-object associations and automatic evaluations were moderated by object valence. Specifically, in a mere-ownership scenario, participants indicated stronger self-object associations for the owned object compared to that for the non-owned object only when the alternative objects are of positive valence and not when they are of negative valence. These results are consistent with the predicted moderating roles of pre-existing levels of self-object congruence and incongruence in the formation of self-object associations in the mere-ownership scenario. The results on automatic evaluations indicate an ownership effect on automatic evaluation in the positive-objects condition but not in the negative-objects condition. The similarity between the pattern of findings on self-object associations and that on automatic evaluations is consistent with the postulated mechanism of valence transference from the self to the owned object. Taken together, the findings from Study 1 are consistent with the prediction of the present research.

## 2.2 Study 2: Mere-ownership vs. choice

The findings of Study 1 suggest that pre-existing self-object congruence/incongruence facilitates/inhibits the formation of self-object associations in the mere-ownership scenario. In the ownership-by-choice scenario, however, this should not be the case. As specified in the second prediction outlined in Chapter 1 (p. 14), when individuals can

choose between alternative objects, information processing of the objects during choice making should change the representations of the objects in a way that increases the degree of self-object congruence for the more preferred object relative to the less preferred object. The choice-induced self-object congruence should then facilitate the formation of self-object association for the chosen object—assuming that individuals tend to choose the more preferred object over the less preferred one—regardless of the pre-existing level of self-object congruence for the objects. Therefore, even for the negative objects (e.g. snake pictures) that are evaluatively incongruent with the self, formation of self-object association can still be possible when individuals choose between two negative objects. Thus, for negative objects, an ownership effect on self-object associations should be found in the ownership-by-choice scenario, but not in the mere-ownership scenario (as indicated by the findings of Study 1). The main goal of Study 2 was to test this prediction.

The study focused on negative objects only, with positive objects being excluded from the experimental design. This decision was due to several reasons. First, according to the current theorizing, the ownership effect on self-object association was predicted to be found for negative objects only in the ownership-by-choice scenario and not in the mere-ownership scenario. In contrast, for positive objects, the ownership effect was predicted to be present in both scenarios, possibly at a higher level in the ownership-by-choice scenario than in the mere-ownership scenario. Therefore, negative objects provide a better means than positive objects to test the presumed difference between the two scenarios: a higher level of information processing that changes object representations in the ownership-by-choice scenario than in the mere-ownership scenario. Second, the question of whether formation of self-object association is possible for negative objects is, by itself, intuitively interesting, especially considering that most of previous studies on ownership and choice (e.g., Beggan, 1992; Gawronski et al., 2007; Huang et al., 2009) have involved objects with positive or neutral valence (e.g., consumer products, good-looking postcards, or pencils) but never objects with negative valence. The third reason is a practical one: The manipulation of object valence would require doubled sample sizes. For the same practical reason, the following studies (Studies 3, 4, and 5) also focused on negative objects with positive objects excluded.

The study included a measure of self-object associations that is different from the one employed in Study 1. The main reason for the change of measure was the relatively small effect sizes (and thus, low statistical power) of the findings in Study 1, which might be due to the low reliability of sequential priming measures (see Gawronski & De Houwer, 2014). In the current and the following studies, a measure based on the implicit association test (IAT, Greenwald, McGhee, & Schwartz, 1998) was used. The IAT typically shows high estimates of reliability (Gawronski & De Houwer, 2014) and high levels of construct validity for measuring mental associations related to the self (e.g., Greenwald & Farnham, 2000). One limitation of the IAT, however, is that it assesses relative associations of two target concepts (e.g., the owned object and the non-owned object) with two attributes (e.g., strength of associations with ‘self’ and that with ‘other’, Greenwald et al., 1998). In the context of the present research, this limitation implies that self-object associations measured by the IAT reflect the relative strength of self-object associations for one object over the other, rather than absolute associations for each object.

The automatic evaluation measure was excluded from the study (and the following studies) due to potential interference from the performance in the first IAT task on the performance in the second IAT task, if two IAT tasks are completed consecutively within the same experimental session (Nosek, Greenwald, & Banaji, 2005). Moreover, practically, the inclusion of an automatic evaluation measure would require counterbalancing the order of the self-object association measure and the automatic evaluation measure between participants, requiring doubled sample sizes. For these reasons, it was decided that this study, along with the following studies, would mainly focus on self-object associations—the key construct of the current research.

## 2.2.1 Method

### 2.2.1.1 Participants and Design

A total of 100 participants (65 women and 35 men; mean age 23.1 years) were recruited through posters on campus, as well as using the summer subject pool mailing lists of the Department of Psychology, University of Western Ontario. Participants received \$10 as



compensation for their participation in a 3-component study that lasted approximately one hour. One participant's data were lost due to a computer malfunction.

The study included a single between-subjects factor (Ownership Scenario: mere-ownership vs. choice). The dependent variable was an IAT index reflecting relative self-object associations for owned versus non-owned objects. The scoring method for this index will be introduced in the results section.

### 2.2.1.2 Ownership task

Following the procedure in Study 1, participants were told that they would receive a picture as a special token of appreciation, and that for this purpose, two alternative pictures would be randomly selected from a large collection. In the mere-ownership condition, participants were told that the picture they were about to receive would be randomly selected from the two alternative pictures by the computer. In the choice condition, participants were told that they would be allowed to freely choose the picture that they personally prefer from the two alternative pictures. The two snake pictures used in Study 1 were then presented on the screen. In the mere-ownership condition, participants were told to press the space bar to start the same "random selection" process as in Study 1. In the choice condition, participants were told to take a careful look at the two pictures and think about which one they prefer. After 20 seconds of display, they were asked to press the *Numpad 1* key to choose the picture on the left side of the screen and *Numpad 2* to choose the picture on the right side. The position (left and right) of two pictures was counter-balanced between participants, such that for half of the participants Snake A appeared on the left side and Snake B appeared on the right side, whereas for the other half Snake A appeared on the right and Snake B appeared on the left. The picture that they chose was subsequently framed in yellow. After the owned picture was determined, all participants were asked to contact the experimenter. The experimenter then returned to the testing room, asked the participants which picture they chose, made a note on their choice, and told the participants that a copy of the selected picture was reserved for pick-up after the study.

### 2.2.1.3 IAT-based measure of self-object associations

In a “quick categorization task”, participants were asked to categorize target pictures or words according to the category labels displayed on the top-left and top-right corners of the screen by pressing a left-handed key (A) or a right-handed key (*Numpad 5*) as quickly as possible without making too many errors. Response latencies and errors were recorded.

The task comprised 5 blocks that differed in terms of the target stimuli (words, pictures, or both) and response categories. According to the standard IAT paradigm (Greenwald et al., 1998), Block 1 consisted of 20 trials of the initial target-concept discrimination task. The two snake pictures from the ownership task were used as both category labels (with the picture of Snake A as the top-left category and the picture of Snake B as the top-right category) and target pictures. Block 2 consisted of 20 trials of the attribute discrimination task (Greenwald et al., 1998), with “self” as the top-left category and “other” as the top-right category. Five words related to self (i.e., *self, me, I, mine, my*) and 5 words related to other (i.e., *other, them, their, they, it*) were used as target stimuli. Block 3 consisted of 60 trials of the first combined task, with “self or Snake A (the picture)” as the top-left category and “other or Snake B (the picture)” as the top-right category. The target stimuli were the 2 snake pictures (presented 15 times each) and the 10 self-related and other-related words (presented 3 times each). Block 4 consisted of 20 trials of the reversed target-concept discrimination task, with Snake B as the top-left category and Snake A as the top-right category. Block 5 consisted of 60 trials of the reversed (or second) combined task, with “self or Snake B” as the top-left category and “other or snake A” as the top-right category. The target stimuli were same pictures and words as in Block 3. Whenever a false response was made, the word “Error” was displayed on the screen for 1000ms before participants could move on to the next trial. The order and settings of Block 3 and Block 5, the two blocks with the combined task, were fixed for all participants. The significance of this setting for the interpretation of the findings will be discussed in the results section.

### 2.2.1.4 Procedure

The study was run as the last component of a three-component battery. Participants were seated in 5 separate computer cells in a large room. After signing informed consent forms, they were randomly assigned to one of the two conditions of Ownership Procedure (choice vs. mere-ownership) and completed the corresponding ownership task, the IAT measure, and a demographic questionnaire. All participants were fully debriefed about the purpose of this study and receive a 4-inch by 6-inch print-out of the selected picture along with the \$10 compensation for participating in all 3 components.

## 2.2.2 Results

Among the 50 participants in the choice condition, 24 chose Snake A and 26 chose Snake B, suggesting that the two images had comparable valence across participants at the aggregate level.

### 2.2.2.1 Data Preparation

The IAT measure was scored using the D-600 algorithm (Greenwald, Nosek, & Banaji, 2003). The score reflects the difference in mean response latency between the two combined blocks (block 5 and block 3) divided by the overall variation in those latencies. Following Greenwald et al.'s (2003) procedure, two separate IAT indices were calculated using the first 20 trials and the last 40 trials of block 3 and 5, respectively. As an indicator of internal consistency, the Cronbach's  $\alpha$  of the two subordinate IAT scores was .58. The two scores were then averaged to produce a single IAT index, with higher scores indicating higher levels of self-object associations for Snake A over Snake B. This index was then re-coded to reflect relative self-object associations for the owned versus non-owned picture using information of which object each participant owned, by random assignment or by choice. If a participant owned a picture of Snake A, the original IAT index remained unchanged for this participant. If a participant owned a picture of Snake B, the original IAT core was reversed for this participant, so that the new score reflected the strength of self-object associations of Snake B over Snake A. Higher scores of this new index indicate stronger self-object associations for the owned object in relative to the non-owned object. As the ownership effect on self-object association was defined as the

advantage of the owned object over the non-owned object in self-object associations, the new IAT index is in fact a direct indicator of this ownership effect.

The well-documented block order effect on IAT scores (see Nosek et al., 2005) indicates that response latencies in the initial combined block (Block 3) tend to be shorter than those in the reversed combined block (Block 5). Because block order was not counterbalanced in the current study, the effect of block order was in the same direction as the ownership effect for participants who owned the picture of Snake A, whereas the order effect was in the opposite direction as the ownership effect for participants who the picture of Snake B. However, this block order effect is controlled at the aggregate level because of the equal number of participants who owned the picture of Snake A versus Snake B in each of the two experimental conditions. Therefore, an IAT score of zero can be used as a neutral reference point, such that an aggregated group mean that is significantly larger than zero can be interpreted as indicating a significant ownership effect on self-object associations. Nevertheless, IAT block order can be a source of systematic error variance, and was therefore controlled in all of the following analyses to increase statistical power.

### 2.2.2.2 Main Analysis

Results from preliminary analyses indicate that the variable of picture position (left vs right) did not influence the outcomes of the following analyses. This variable was therefore excluded from the following analyses. The IAT index of self-object associations was submitted to a 2 (Ownership Scenario, mere-ownership vs. choice, between Ss)  $\times$  2 (IAT Block Order: owned object paired with the self in the 1<sup>st</sup> combined block vs. owned object paired with the self in the 2<sup>nd</sup> combined block, between Ss) ANOVA using Model 1, which is based on unweighted group means and therefore eliminated the effect of unequal sample means between groups. The analysis yielded a significant main effect of IAT Block Order,  $F(1, 95) = 53.82, p < .001, \eta_p^2 = .36$ , indicating faster response latencies in the 1<sup>st</sup> combined block than in the 2<sup>nd</sup> combined block. More important for the current investigation, the ANOVA also revealed a significant main effect of Ownership Scenario,  $F(1, 95) = 5.86, p = .017, \eta_p^2 = .058$ . No other effects were significant, all  $ps > .05$ . The means are shown in Table 2.3.

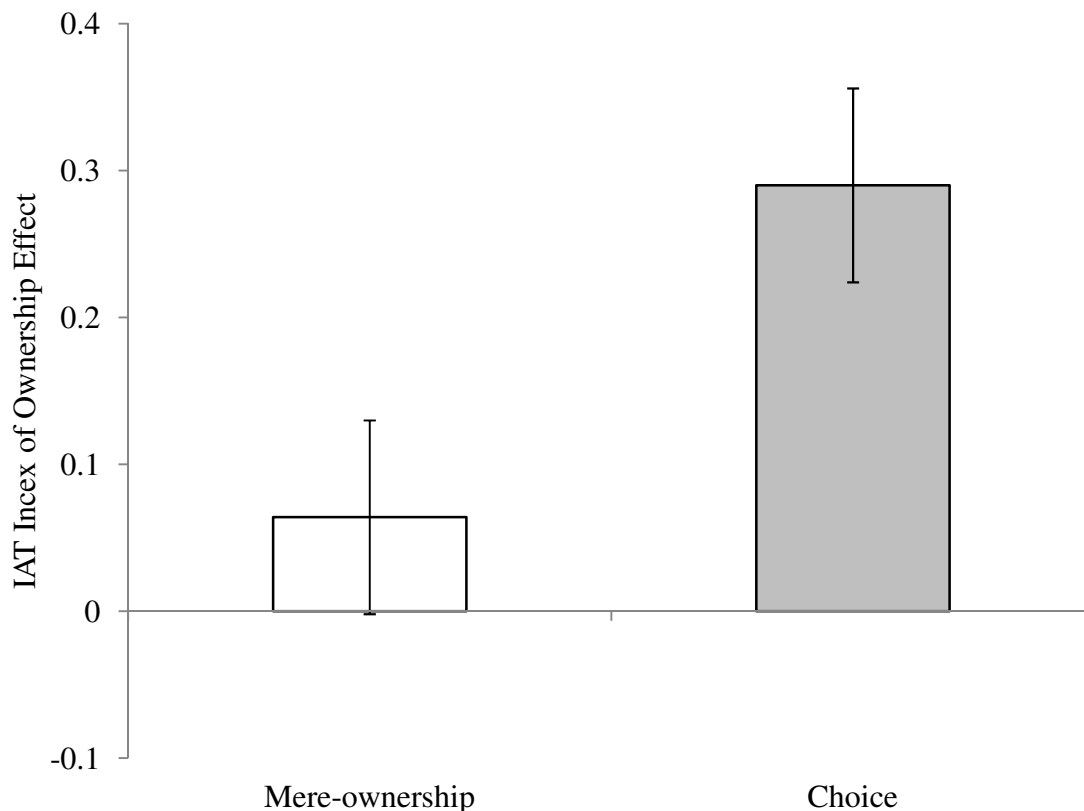
**Table 2.3. Mean ownership effects on self-object associations in Study 2**

Ownership Scenario	IAT Block Order	
	Owned object-self in 1 <sup>st</sup> combined block	Owned object-self in 2 <sup>nd</sup> combined block
Mere-ownership	0.38(0.48)	-0.25(0.59)
Choice	0.66(0.35)	-0.08(0.40)

N = 99. Numbers in parentheses are standard deviations.

As depicted in Figure 2.4, the results are consistent with the prediction, indicating that the ownership effect on self-object associations was larger in the choice condition than in the mere-ownership condition. Because Levene's test revealed that error variance of the IAT index was did not significantly differ across groups,  $F(3, 95) = 1.61, p = .19$ , the estimated population standard deviation ( $SD_{\text{population}} = 0.46$ ) was used in the following t-tests<sup>6</sup>. Ad-hoc t tests of the unweighted group means for Ownership Scenario revealed that the ownership effect was significantly larger than zero in the choice condition,  $M = 0.29, t(49) = 4.42, p < .001, 95\% \text{ C.I. } [0.16, 0.42]$ , but not in the mere-ownership condition,  $M = 0.064, t(48) = 0.97, p = .34, 95\% \text{ C.I. } [-0.07, 0.20]$ .

<sup>6</sup> As the t tests were conducted on the basis of the unweighted means, the standard deviations used for the t tests are the estimated population standard deviation by the square root of the mean square error term from the ANOVA. The same applies to the following studies.



**Figure 2.4. Ownership effects on self-object associations as a function of ownership scenario in Study 2. Error bars represent standard errors.**

### 2.2.3 Discussion

The goal of Study 2 was to test the second prediction of the present research, that for objects that are incongruent with the self, the ownership effects on self-object associations should be moderated by choice. Consistent with the prediction, the results in the mere-ownership condition replicated the results of Study 1, while the results in the choice condition indicate an ownership-by-choice effect on self-object associations. According to the assumptions of the current model, the ownership-by-choice effect in the choice condition of the current study indicates the effect of choice-related information processing. There is an alternative explanation, however, which is related to a problem with the free-choice paradigm (Brehm, 1956) adopted in the choice condition. In this paradigm, participants make a choice between two objects before completing measures on certain attributes of the two objects (e.g., explicit evaluations, self-object

associations). Importantly, when analyzing the responses from the participants, researchers use the outcome of each participant's choice to retrospectively label the two objects as either chosen or rejected. Chen and Risen (2010) point out that a problem with this practice is that the choice outcomes are not determined by random assignment. Instead, they are (imperfect) indicators of the participants' preferences. In relation to the present research, Chen and Risen's (2010) argument implies the possibility that the ownership-by-choice effect on self-object association reflects pre-existing differences in self-object congruence between the two objects, instead of the causal effect of choice-related processing, to the extent that participants tend to choose the object with a relatively higher pre-existing level of self-object congruence.

This possibility further implies a different role of choice than the one assumed in the present research. That is, choice is influenced by pre-existing differences in the levels of self-object congruence between the two alternative objects, instead of influencing the levels of self-object congruence through information processing. As it poses a threat to the internal validity of the current study, this alternative interpretation needs to be tested.

### 2.3 Study 3: Pre-choice vs. post-choice

In Study 2, an ownership-by-choice effect on self-object associations was found with negative objects as choice alternatives. As mentioned, however, it is possible that this effect is caused not by choice-induced differences, but by pre-existing differences, in self-object congruence between the chosen object and the rejected object. The goal of Study 3 was to distinguish between three accounts of the obtained effects by adopting a pre-post between-subjects design, in which self-object associations were measured either before participants are introduced to the ownership-by-choice scenario or after they have indicated their choices.

The first account is that the ownership-by-choice effect is driven solely by choice. According to this account, the effect should be observed after participants have indicated their choices but not before they are introduced to the ownership-by-choice scenario. The second account is that the effect is driven solely by differences between choice alternatives in self-object congruence that pre-exist before the choice. If this is the case,

then the same levels of effect should be observed before participants are introduced to the ownership scenario and after they have indicated their choices. The third account is that the effect is jointly driven by pre-existing differences between the alternative objects in self-object congruence and choice-related processes that further polarized the pre-existing differences. According to this account, a stronger effect should be found after participants have indicated their choices as compared to before they are introduced to the ownership-by-choice scenario.

## 2.3.1 Method

### 2.3.1.1 Participants and design

A total of 90 participants (50 women, 38 men, 2 unspecified; mean age 20.4 years with 1 unspecified) were recruited from the subject pool of the Department of Psychology, University of Western Ontario for research credit. Data from three participants were lost due to computer malfunctions. The study included a single between-subjects factor (Time of Measurement, pre-choice vs. post-choice). The dependent variable was the same IAT index used in Study 2, which reflected the relative strength of self-object associations of one object over another.

### 2.3.1.2 Time of measurement

The two snake pictures from Studies 1 and 2 were used as choice alternatives. In the pre-choice condition, participants were asked to complete the IAT-based measure of self-object associations from Study 2 at the very beginning of the study. Because they were asked to categorize the two snake pictures during the first block of the IAT measure, participants had the opportunity to process the choice alternatives before being measured on self-object associations. After completing the measure, they were introduced to the choice task adopted from the choice condition of Study 2 and subsequently received a print of the chosen picture. In the post-choice condition, participants were first introduced to the choice task, which was followed by the IAT measure of self-object associations. The position (left and right) of Snake A and Snake B in the choice task was again counter-balanced between participants.



### 2.3.1.3 Procedure

The testing was completed in separate testing rooms, each of which was equipped with a single computer. Different from Studies 1 and 2, the study was not combined with any other components in a larger battery of studies. After signing informed consent forms, participants were randomly assigned to one of the two conditions of Time of Measurement: pre-choice or post-choice. They then completed the IAT measure and the choice task one after another, with the order of the two depending on the condition. At the end of the study, all participants were fully debriefed about the purpose of the study and received a 4-inch by 6-inch print-out of the chosen picture along with the research credit.

### 2.3.2 Results

In the pre-choice condition, 20 participants chose Snake A and 24 chose Snake B. In the post-choice condition, 21 participants chose Snake A and 21 chose Snake B.

The IAT data were processed in the same way as in Study 2. As an indicator of internal consistency, the Cronbach's  $\alpha$  of the two subordinate IAT scores was .55. The two scores were averaged into a single IAT score, which was recoded, according to the choice outcome of each participant, to a new index that reflects the relative size of ownership effect on self-object associations. Results from preliminary analyses indicate that the variable of picture position (left vs right) did not influence the outcomes of the following analyses. This variable was therefore excluded from the following analyses.

The IAT index of self-object associations was submitted to a 2 (Time of Measurement, pre-choice vs. post-choice, between Ss)  $\times$  2 (IAT Block Order: owned object paired with self in the 1<sup>st</sup> combined block vs. owned object paired with self in the 2<sup>nd</sup> combined block, between Ss) Model 1 ANOVA analysis. The analysis yielded a significant main effect of IAT Block Order,  $F(1, 83) = 59.90, p < .001, \eta_p^2 = .42$ , which was in the same direction as that found in Study 2 and indicated faster response latencies in the 1<sup>st</sup> combined block than in the 2<sup>nd</sup> combined block. Most importantly for the current purpose, the analysis yielded a significant main effect of Time of Measurement,  $F(1, 83) = 4.58, p = .035, \eta_p^2 = .052$ . No other effects were significant, all  $ps > .05$ . The means are shown in Table 2.4.

**Table 2.4. Mean ownership effects on self-object associations in Study 3**

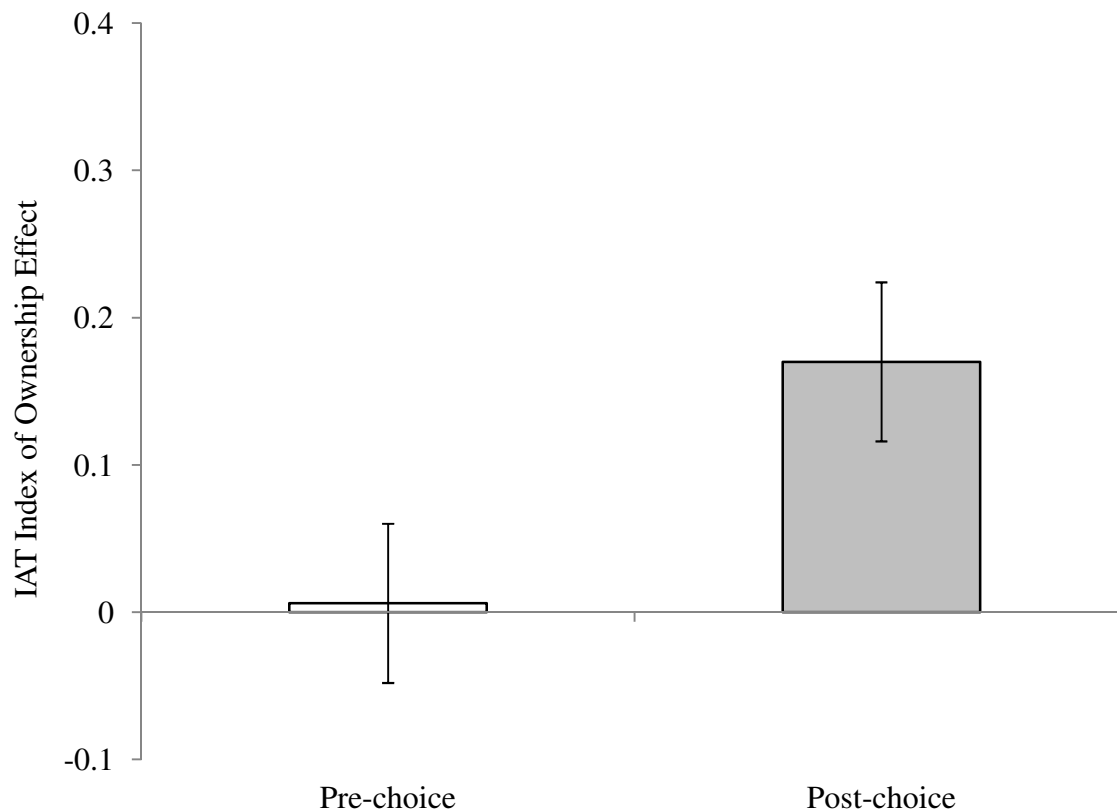
Time of Measurement	IAT Block Order	
	Owned object-self in 1 <sup>st</sup> combined block	Owned object-self in 2 <sup>nd</sup> combined block
Pre-choice	0.33(0.36)	-0.32(0.34)
Post-choice	0.44(0.38)	-0.10(0.35)

N = 87. Numbers in parentheses are standard deviations.

As depicted in Figure 2.5, the results indicate that the level of ownership-by-choice effect on self-object associations were stronger for post-choice measurements than pre-choice measurements. Because Levene's test revealed that error variance of the IAT index was not significantly different across groups,  $F(3, 83) = .014, p = 1.00$ , the estimated population standard deviation ( $SD$  population = 0.36) was used in the following t-tests. Ad-hoc t tests of the unweighted group means of Time of Measurement revealed that the mean ownership effect was significantly different from zero in the post-choice condition,  $M = 0.17, t(42) = 3.09, p = .004, 95\% \text{ C.I. } [0.06, 0.28]$ , but not in the pre-choice condition,  $M = 0.006, t(43) = 1.11, p = .27, 95\% \text{ C.I. } [-0.10, 0.11]$ .

### 2.3.3 Discussion

The results of Study 3 indicate an ownership-by-choice effect on self-object associations after participants have indicated their choices, but not before participants were introduced to the ownership-by-choice scenario. This finding is consistent with the first account that the ownership-by-choice effect is caused by choice and inconsistent with the both second account that that the effect was caused by pre-existing differences between the two alternative objects in self-object congruence and the third account that the effect was caused jointly by choice and the pre-existing differences in self-object congruence.



**Figure 2.5. Ownership effects on self-object associations as a function of time of measurement in Study 3. Error bars represent standard errors.**

The findings from Studies 1, 2, and 3 have supported the imbalance-dissonance principle and the balance-congruity principle by showing that while the mere-ownership of a negative object cannot, the ownership-by-choice of the negative object can lead to a self-object association for the object. It is assumed that the latter effect is mediated by choice-related information processing that creates a certain level of self-object congruence in the representation of the negative object. In the previous chapter, two types of choice-related information processing—pre-choice and post-choice processing—were discussed. Pre-choice processing involves evaluating and eliminating choice alternatives in order to develop a preference (Brownstein, 2003), while post-choice processing involves re-evaluations of the choice alternatives or selective exposure to choice-confirming information in order to reduce post-choice dissonance (Festinger, 1964). Studies 4 and 5 were designed to further examine, with negative objects, how certain psychological factors pertinent to pre- and post-choice processing influence self-object associations.

## 2.4 Study 4: Self-relevance and ownership effects

The findings of Studies 2 and 3 suggest that the ownership effect on self-object associations found for negative objects is caused by choice. The underlying assumption, as specified in Chapter 1, is that information processing during choice changes the representations of the alternative objects and leads to higher levels of self-object congruence for the chosen object over the rejected object. Two relevant questions can be subsequently raised here. First, one may wonder if the degree of the ownership effect on self-object associations is contingent on factors that may influence choice-related information processing. To the extent that enhanced levels or efforts of information processing lead to higher levels of self-object congruence for the chosen object over the rejected object, factors that influence information processing should also influence self-object associations. Second, the individual roles of pre-choice vs. post-choice processing on the ownership-by-choice effects are unclear. In Chapter 1, it was argued that, while pre-choice processing influences object representations and creates self-object congruence, the route through which post-choice processing influences object representations and self-object congruence is less clear. Studies 4 and 5 were designed to answer these questions.

The main goal of Study 4 was to examine how factors that influence the level of *self-relevance* (Gendolla, 1999; Schmitz & Johnson, 2007) of choice influences self-object associations. The main assumption is that when the outcomes of a task are relevant to an individual (e.g., with implications for the individual's self-esteem), he or she tends to be more cognitively and emotionally engaged in the task, relative to when the outcomes are not relevant to the individual (Graham & Golan, 1991). Although unspecified, the idea of self-relevance is inherited in the ownership-by-choice scenario, and during both the pre-choice period and post-choice period. Recall that, in Studies 2 and 3, participants always had prospective ownership of the chosen object before indicating their choices. The knowledge and ownership expectation might have enhanced the self-relevance of choice, which may further lead to increased efforts of pre-choice processing and, consequently, enhanced levels of ownership-by-choice effect on self-object associations. In other words, removing participants' ownership expectation of the chosen object may reduce the levels

of self-relevance during pre-choice processing, and subsequently reduce the ownership-by-choice effect on self-object associations.

Also recall that, in Studies 2 and 3, participants were told after they have indicated the choice that a copy of the chosen object was reserved for them and they could pick it up after the completion of the study. Afterwards, they went on to take the measure of self-object associations, without actually having physical possession of the chosen object. If they have physical ownership of the chosen object after the choice and before completing the self-object association measure, they may engage in higher levels of post-choice processing, which may lead to enhanced levels of ownership-by-choice effect on self-object associations.

In the current study, two factors pertinent to self-relevance of choice: *pre-choice ownership expectation* (ownership expectation hereafter) and *post-choice physical ownership of chosen object* (physical ownership hereafter) were manipulated. It is predicted that the both ownership expectation and physical ownership should enhance the ownership-by-choice effect on self-object associations.

## 2.4.1 Method

### 2.4.1.1 Participants and Design

A total of 154 participants (105 women, 43 men, 6 unspecified; mean age 19.5 with 7 unspecified) from the subject pool of the University of Western Ontario participated for research credit. The study adopted a 2 (Ownership Expectation: with vs. without)  $\times$  2 (Physical Ownership: with or without) between-subjects design. The dependent variables included the same IAT used in Studies 2-3 and a new measure of explicit evaluations to test the predictions regarding the relative size of the spreading-of-alternatives effect, which pertains to evaluations of chosen and rejected objects in classic cognitive dissonance research (Festinger, 1964).

### 2.4.1.2 Ownership expectation

Participants first went through a choice task. In the ownership expectation condition, they were told that they would receive a gift picture as a special token of appreciation. In the

no ownership expectation condition, they were not told about the gift at the beginning of the choice task; instead, they were simply told that their task was to evaluate two pictures and indicate which one they personally prefer.

Participants then went through a similar procedure of choice as the one included in Studies 2 and 3. The two snake pictures from the previous studies were used as choice alternatives. The positions of Snake A and B on the screen (left/right) were counterbalanced between participants. When the two alternative pictures were displayed on screen for choice, those in the ownership expectation condition were asked which one they prefer and want to own, while those in the no ownership expectation condition were asked simply which one they prefer. Importantly, after indicating choices, those in the no ownership expectation condition were then told that actually that they would receive a print of the picture that they just chose as a special token of appreciation. Therefore, participants in both conditions were aware of their prospective ownership of the chosen object at the end of the choice task, and the effect of ownership expectation was constrained, in terms of time frame, to the information processing during pre-choice processing. The potential limitation of this setup will be discussed later in this study.

#### 2.4.1.3 Physical ownership

After indicating their choice, participants were asked to contact the experimenter. The experimenter then followed the participant back to the testing room and asked him/her which picture he/she had chosen. In the physical ownership condition, the experimenter took a print of the chosen picture and handed it to the participant, asking them to put it either in their bags (if any) or on the table facing down so they could not see it during the rest of the study. In the no physical ownership condition, the experimenter told the participant that a print of the chosen picture would be reserved for them and they could get it after the study. The experimenter then left the room and the participant would continue the study.

#### 2.4.1.4 Measures

The same IAT-based measure as that used in Studies 2 and 3 was included as the measure of self-object associations. A measure of post-choice explicit evaluations of the two

objects was included as a manipulation check for post-choice physical ownership of the chosen object. In Chapter 1, the possibility was discussed that post-choice processing may influence explicit evaluations but not self-object associations, as it may not change the representations of the choice alternatives. Therefore, an explicit evaluation measure can serve as an indicator of the effect of post-choice physical ownership on post-choice processing.

Following the completion of the IAT task, participants were asked to evaluate each snake picture on three 6-point semantic differential scales with regard to the dimensions attractive/unattractive, unpleasant/pleasant, and terrible/great. The order between the IAT-based measure of self-object association and the explicit evaluation measure was not counter-balanced, due to the consideration that the performance in the former is unlikely to influence that in the latter, whereas the performance in the latter is likely to influence that in the former. Specifically, it is argued that the perception of one's performance in an IAT-based measure of self-object association is unlikely to be used by the participants as information for evaluative judgments, while evaluations are likely to influence the representations of the two objects and activate associations that might further influence the performance in an IAT task (Nosek et al., 2005).

#### 2.4.1.5 Procedure

The study was run as the first component of a 3-component package. After signing informed consent forms, participants were randomly assigned to one of the four conditions. They completed the choice task, the IAT task, and the explicit evaluation measure in this order, before completing a demographic questionnaire. At the end of the study all participants were fully debriefed about the purpose of the study. Those in the physical ownership condition received a print of the chosen picture before the IAT task, whereas those in the no physical ownership condition received their print at the end of the study.

#### 2.4.2 Results

Overall, 69 participants chose Snake A and 80 chose Snake B. The breakdown for each condition is as follows: 18/19 (choosing Snake A/Snake B, same in the following) in

ownership expectation/physical ownership group, 22/19 in ownership expectation/no physical ownership group, 12/24 in no ownership expectation/physical ownership group, and 17/18 in no ownership expectation/no physical ownership group. The unequal sample sizes between those who have chosen Snake A ( $N = 12$ ) and those who have chosen Snake B ( $N = 24$ ) in the no ownership expectation/physical ownership condition are not considered as a concern, as in Model 1 ANOVA, the analyses were based on unweighted means that are unaffected by unequal sample sizes between cells.

The IAT data were processed in the same way as in Studies 2 and 3. Data of 5 participants were missing due to program malfunctions, resulting in an effective sample size of 149. The Cronbach's  $\alpha$  of the two subordinate IAT scores was .53. The two IAT scores were averaged and recoded (using choice outcome information) into a new IAT index of the relative size of ownership effects on implicit self-object associations.

With regard to explicit evaluation data, the Cronbach's  $\alpha$  was .82 for the 3 items on Snake A and .86 for the 3 items on Snake B. Item scores were averaged for each object, and the two resultant explicit evaluation scores were recoded (again using choice outcome information) to two explicit evaluation scores for the chosen and rejected objects.

#### 2.4.2.1 Self-object associations

Preliminary analyses indicated that the position of the two pictures did not influence the results of the following analyses and therefore was removed from the analyses. To investigate the hypothesized effects of ownership expectation and physical ownership, the IAT index was submitted to a 2 (Ownership Expectation, with vs. without, between Ss)  $\times$  2 (Physical Ownership, with vs. without, between Ss)  $\times$  2 (IAT Block Order: the owned object paired with self in the 1<sup>st</sup> combined block vs. the owned object paired with self in the 2<sup>nd</sup> combined block, between Ss) Model 1 ANOVA. The analysis yielded a non-significant main effect of Ownership Expectation,  $F(1, 141) = 1.00, p = .32, \eta_p^2 = .007$ , a non-significant main effect of Physical Ownership,  $F(1, 141) = 0.004, p = .95, \eta_p^2 < .001$ , as well as a non-significant interaction between the two factors,  $F(1, 141) = 0.88, p = .35, \eta_p^2 = .006$ . All other effects were non-significant as well, all  $ps > .05$ , except for a significant IAT Block Order effect similar to that found in previous studies,  $F(1, 141) =$



84.25,  $p < .001$ ,  $\eta_p^2 = .37$ . The means and standard deviations are shown in Table 2.5. These results were inconsistent with the hypotheses about the moderating effects of ownership expectation and physical ownership on the degree of ownership effect.

Although no moderating effects on ownership-by-choice effects were found, the baseline ownership-by-choice effect was replicated, as indicated by the results of a series of ad-hoc t-tests like the ones performed in Studies 2 and 3. The analyses revealed, first of all, an overall ownership-by-choice effect in the sample, indicated by an unweighted grand mean that was significantly different from zero,  $M = 0.20$ ,  $SD_{\text{population}} = 0.38$ ,  $t(148) = 6.36$ ,  $p < .001$ , 95% C.I. [0.14, 0.26]. Because Levene's test revealed that error variance of the IAT index was not significantly different across groups,  $F(7, 141) = 1.80$ ,  $p = .09$ , the estimated population standard deviation was used in the following t-tests. Analyses in each condition revealed ownership-by-choice effects in all four groups, indicated by unweighted group means significantly different from zero: in the ownership expectation/physical ownership group,  $M = 0.26$ ,  $t(36) = 4.12$ ,  $p < .001$ , 95% C.I. [0.13, 0.38]; in the ownership expectation/no physical ownership group,  $M = 0.20$ ,  $t(40) = 3.40$ ,  $p = .002$ , 95% C.I. [0.08, 0.32]; in the no ownership expectation/physical ownership group,  $M = 0.13$ ,  $t(35) = 1.99$ ,  $p = .04$ , 95% C.I. [.005, 0.26]; and in the no ownership expectation/no physical ownership group,  $M = 0.20$ ,  $t(34) = 3.08$ ,  $p = .004$ , 95% C.I. [0.07, 0.33]. All group means were in the expected positive direction, indicating higher levels of self-object associations for the chosen object over the rejected object.

**Table 2.5. Mean ownership effects on self-object associations in Study 4**

Ownership Expectation	Physical ownership	IAT Block Order	
		Owned object-“self” in 1 <sup>st</sup> combined block	Owned object-“self” in 2 <sup>nd</sup> combined block
Yes	Yes	0.45(.38)	0.062(0.28)
	No	0.56(0.41)	-0.16(0.36)
No	Yes	0.41(0.32)	-0.15(0.45)
	No	0.52(0.31)	-0.11(0.44)

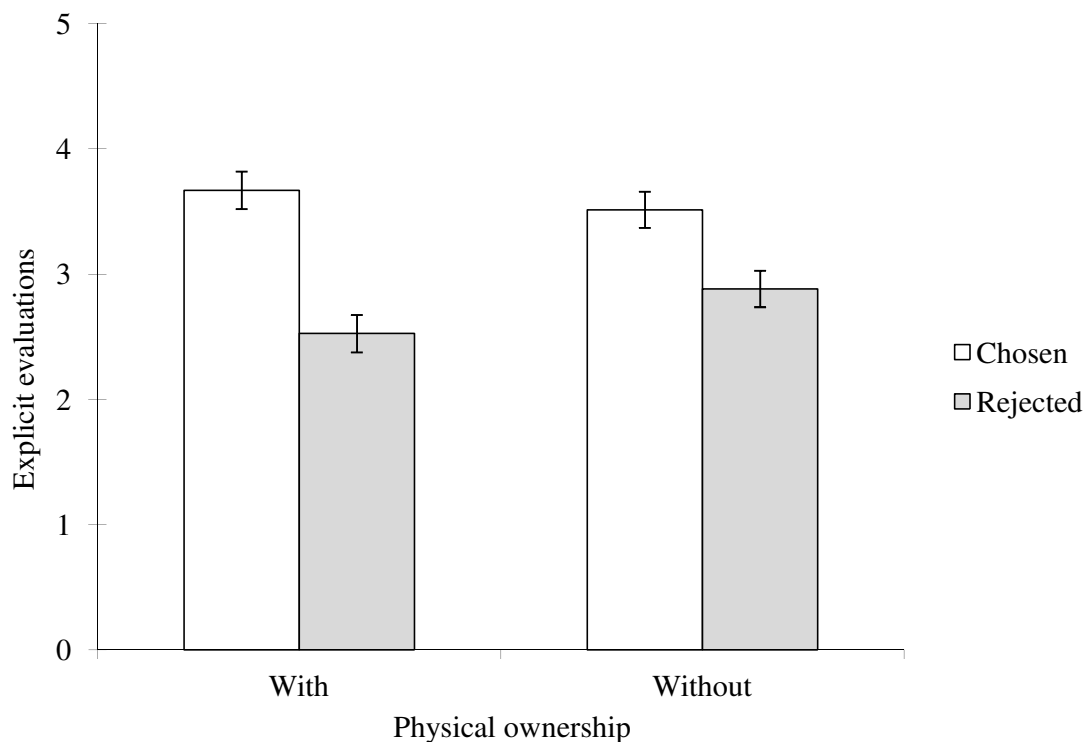
N = 155. Numbers in parentheses are standard deviations.

#### 2.4.2.2 Explicit Evaluations

For explicit evaluations, the data of 5 participants were missing due to computer malfunctions, resulting in an effective sample size of 144 for the following analysis. Explicit evaluation scores were submitted to a 2 (Ownership Expectation, with vs. without, between Ss)  $\times$  2 (Physical Ownership, with vs. without, between Ss)  $\times$  2 (Object Status, chosen/owned vs. rejected/non-owned, within Ss) mixed-model ANOVA. The analysis yielded a significant main effect of Object Status,  $F(1, 136) = 116.04, p < .001, \eta_p^2 = .46$ , and a significant two-way interaction between Object Status and Physical Ownership,  $F(1, 136) = 9.70, p = .002, \eta_p^2 = .067$ . No other effects were significant, all  $ps > .05$ . The results are depicted in Figure 2.6.

To specify this two-way interaction, tests of simple effects indicated that in the physical ownership condition, explicit evaluations of the chosen object ( $M = 3.67$ ) were significantly more positive than explicit evaluations of the rejected object ( $M = 2.53$ ),  $F(1, 136) = 93.57, p < .001, \eta_p^2 = .41$ . The same effect occurred in the no physical ownership condition, but the difference in explicit evaluations of the chosen object ( $M = 3.51$ ) and the rejected object ( $M = 2.88$ ) was much smaller,  $F(1, 136) = 30.25, p < .001,$

$\eta_p^2 = .18$ . Taken together, the results suggest that there was a significant ownership-by-choice effect on explicit evaluations in both conditions of physical ownership, and that the effect was larger when participants had physical ownership of the chosen object as compared to when they did not.



**Figure 2.6. Explicit evaluations of objects as a function of physical ownership and object status (chosen vs. rejected) in Study 4. Error bars represent standard errors.**

### 2.4.3 Discussion

The main goal of Study 4 was to examine the moderating effect of self-relevance on self-object associations. Two factors that were assumed to enhance self-relevance: ownership expectation and physical ownership were manipulated, but neither was found to influence self-object associations. The results, however, did replicate the findings of Study 2 and 3, by indicating an ownership-by-choice effect on self-object associations in the entire sample as well as in each individual condition.

The results on explicit evaluations indicate the same ownership-by-choice effect on explicit evaluations, indicated by a higher level of positive evaluations for the chosen object than for the rejected object. Interestingly, the ownership-by-choice effect on explicit evaluations was moderated by physical ownership, which was found to have no moderating effect on the ownership-by-choice effect on self-object associations. This implies that explicit evaluations are influenced by mechanisms over and above the ones that influence self-object associations. In other words, enhanced explicit preferences of the chosen object over the rejected object, as the result of physical ownership, might be driven by factors (e.g., extraneous motives) that influence evaluative judgments but not the underlying representations of the objects.

One possibility is that physical ownership leads to enhanced levels of post-choice dissonance, which subsequently lead to enhanced ownership-by-choice effect on explicit evaluation, an effect similar to the spreading-of-alternatives effect (Brehm, 1956; Festinger, 1964). Consistent with the null effect of physical ownership on self-object associations, Gawronski and Strack (2004) found that cognitive dissonance influences explicit evaluations but not automatic evaluations, implying that dissonance leads to changes in evaluative behaviours but not in underlying mental associations.

It is also possible that physical ownership leads to enhanced motivation of self-enhancement. According to Beggan (1992), the mere-ownership effect on explicit evaluations is driven by the owner's need to view oneself in a positive light. Physical ownership may further enhances the self-enhancement property of ownership, as positive evaluations of objects in one's physical possession may be more self-enhancing than positive evaluations of objects that are not in one's physical possession. Future research can identify the exact motivations that underlie the factor of physical ownership and influence explicit evaluations of the objects.

The null (moderating) effects of ownership expectation on both self-object associations and explicit evaluations are less interesting. Although a possible explanation is both self-object associations and explicit evaluations are not influenced by the level of pre-choice processing, manipulation failure seems to be a more parsimonious explanation. Due to

several reasons, the manipulation of ownership expectation in the current study has limitations. First, self-object associations were measured after participants indicated their choice, while ownership expectation was assumed to influence pre-choice processing. Any event that occurs between the end of pre-choice processing and the self-object association measure (e.g., the indication of choice, the manipulation of physical ownership) may confound the effects. It would have been ideal to measure self-object association after the pre-choice processing and before instead of after the choice. Second, as self-object associations were measured after the manipulation of physical ownership, there was an unwanted outcome that all participants, regardless of the condition of ownership expectation, had knowledge about the prospective ownership at the time of measurement. It would have been ideal to keep the ownership expectation constant throughout the ownership-by-choice scenario, so that any confound associated with the knowledge of prospective ownership can be controlled. These limitations were addressed in Study 5.

## 2.5 Study 5: The indication of choice

The goal of Study 5 was two-fold. The first goal was to test the effect of pre-choice ownership expectation with a manipulation improved over Study 4's. In the current study, participants either did or did not have ownership expectation throughout the entire study instead of before they indicated their choices. In addition, the measures were placed either after pre-choice processing and before participants indicated their choices or after they had indicated their choices. This manipulation allows for the estimations of the independent effects of pre- and post-choice processing.

The second goal was to further examine the effect of post-choice processing on self-object association with the focus on a key factor in the cognitive dissonance model—the indication of choice. According to the post-choice dissonance model (Festinger, 1957, 1964), the cognitive element representing the choice is a prerequisite for the experience of cognitive dissonance, as no cognitive inconsistency or cognitive dissonance will take place if the individuals do not make the choice and therefore not commit to one alternative. The indication of choice initiates the experience of cognitive dissonance and dissonance-driven post-choice processing. Therefore, any changes of the ownership-by-

choice effect on self-object associations from right before to after the choice should indicate the influence from dissonance-driven post-choice processing.

Study 5 examined the effects of ownership expectation and the indication of choice on self-object associations. As half of the participants did not have ownership of the object throughout the study, the term *choice effect* on self-object associations is used instead of ownership-by-choice effect. It was predicted that both the two factors of interest: ownership expectation and indication of choice should increase the levels of choice effect on self-object association.

## 2.5.1 Method

### 2.5.1.1 Participants and Design

A total of 139 participants (94 women, 45 men, mean age 18.9 years with 2 unspecified) from the subject pool of the University of Western Ontario participated in the study for research credit. The study adopted a 2 (Ownership Expectation: with vs. without)  $\times$  2 (Time of Measurement: post-processing & pre-choice vs. post-choice) between-subjects design. The dependent variables were the same as in Study 4: the IAT measure of self-object associations and explicit evaluations of the two objects.

### 2.5.1.2 Ownership expectation

The manipulation of ownership expectation followed the same procedure as in Study 4, except one difference: unlike participants in the no ownership expectation condition of Study 4 who gained the knowledge of prospective ownership after the choice, participants in the no ownership expectation condition in this study never received any information about ownership throughout the study. Instead, their task was to evaluate the two objects and indicate which one they personally prefer. In this sense, this condition can also be called the mere-choice condition, as participants in this condition merely make a choice without owning the chosen object. Otherwise, all procedures and instructions of this experimental manipulation were identical to Study 4. The left/right positions of Snake A and Snake B was again counter-balanced between participants.

### 2.5.1.3 Measures

The IAT measure from previous studies and the explicit evaluation measure from Study 4 were included. The explicit evaluation measure was included as a manipulation check for post-choice processing, as shown in Study 4, post-choice processing might influence explicit evaluations but not self-object associations.

### 2.5.1.4 Time of Measurement

After all participants spent 20 seconds evaluating the two pictures, they were asked if they were ready to indicate their choices. If they reported ready, they were asked to continue. If they indicated not ready, they were asked to spend more time to evaluate the pictures before indicating their choices. After participants reported ready, those in the post-processing and pre-choice condition were told to complete the measures of self-object associations and explicit evaluations before indicating their choices. Those in the post-choice condition were told to indicate their choices before completing the two measures. The order of the two measures was fixed for the reasons mentioned in Study 4. A deviation to the procedure used in the previous studies was that, after indicating their choices, participants in the ownership expectation condition were told by the computer program to remember their choice so that they could receive a copy of the chosen object and then continued the study by themselves. In previous studies, participants would go and find the experimenter who would make a note of the choice outcome and continue the study for them.

### 2.5.1.5 Procedure

The study was run as the only component of a battery. After signing informed consent forms, participants were randomly assigned to one of the four conditions. Then, they were told either to choose a picture as gift or to evaluate two pictures. Half of them completed the measures after they indicated that they were ready to indicate their choices but before they actually did so, while the other half completed the measures after they indicated their choices. Finally, participants completed a demographics questionnaire. At the end of the study all participants were fully debriefed about the purpose of the study. For the sake of saving prints of pictures and to be consistent with the initial information

to participants, only those in the ownership expectation conditions received a print of the chosen picture at the end of the study.

## 2.5.2 Results

Overall, 69 participants chose Snake A and 66 chose Snake B. The breakdown for each condition is as follows: 17/17 in ownership expectation/post processing and pre-choice condition, 20/14 in ownership expectation/post-choice condition, 13/20 in no ownership expectation/post processing and pre-choice condition, and 19/15 in no ownership expectation/post-choice condition.

The IAT data were processed in the same way as in previous studies. The Cronbach's  $\alpha$  of the two subordinate IAT scores was .50. The two IAT scores were then averaged and recoded according to the choice outcome for each participant into a new IAT index of the choice effect on self-object associations. For explicit evaluations, the Cronbach's  $\alpha$  was .83 for the 3 items on Snake A, and .85 for the 3 items on Snake B. The scores were averaged and recoded into two evaluation scores, one for the chosen object and the other for the rejected object.

### 2.5.2.1 Self-object associations

Preliminary analyses with Picture Position included as a factor revealed a significant two-way interaction between Picture Position and Time of Measurement,  $F(1, 119) = 5.30$ .  $p = .023$ ,  $\eta_p^2 = .043$ , and a significant two-way interaction between Picture Position and Ownership Expectation,  $F(1, 119) = 3.91$ .  $p = .050$ ,  $\eta_p^2 = .032$ . Because this was the first time in 4 studies that effects of Picture Position were found, they most likely reflect either (a) Type I errors or (b) incidental stimulus effects that are uninterpretable and irrelevant for the main hypotheses of this study. Moreover, the exclusion of the Picture Position variable did not change any of the results reported in the following. Therefore, the analyses reported here did not include Picture Position as an independent variable.



**Table 2.6. Mean choice effects on self-object associations in Study 5**

Ownership Expectation	Time of Measurement	IAT Block Order	
		Owned-“self” in 1 <sup>st</sup> combined block	Owned-“self” in 2 <sup>nd</sup> combined block
Yes	Post-processing & pre-choice	0.50(0.26)	-0.06(0.34)
	Post-choice	0.46(0.38)	-0.02(0.31)
No	Post-processing & pre-choice	0.58(0.44)	-0.04(0.36)
	Post-choice	0.56(0.39)	-0.12(0.37)

N = 135. Numbers in parentheses are standard deviations.

The IAT index was submitted to a 2 (Ownership Expectation, with vs. without, between Ss) × 2 (Time of Measurement, post-processing & pre-choice vs. post-choice, between Ss) × 2 (IAT Block Order: the chosen object paired with self in the 1<sup>st</sup> combined block vs. the chosen object paired with self in the 2<sup>nd</sup> combined block, between Ss) Model 1 ANOVA. The analysis yielded a non-significant main effect of Ownership Expectation,  $F(1, 127) = 0.17$ ,  $p = .69$ ,  $\eta_p^2 = .001$ , a non-significant main effect of Time of Measurement,  $F(1, 127) = 0.18$ ,  $p = .67$ ,  $\eta_p^2 = .001$ , and a non-significant interaction between these two factors,  $F(1, 127) = 0.12$ ,  $p = .73$ ,  $\eta_p^2 = .001$ . In fact, no effects reached significance other than a significant IAT Block Order effect,  $F(1, 127) = 87.98$ ,  $p < .001$ ,  $\eta_p^2 = .41$ , which was similar to the block order effect found in previous studies. The means and standard deviations are shown in Table 2.6.

Although no moderating effects on ownership-by-choice effects were found, the baseline ownership-by-choice effect was replicated, as indicated by the results of a series of ad-hoc t-tests like the ones performed in Studies 2, 3, and 4. Again, the analyses first revealed an overall choice effect on self-object associations in the sample, indicated by an unweighted grand mean that was significantly different from zero,  $M = 0.23$ ,  $SD_{\text{population}} = 0.36$ ,  $t(134) = 7.52$ ,  $p < .001$ , 95% C.I. [0.17, 0.29]. Because Levene's test revealed that error variance of the IAT index was not significantly different across groups,  $F(7, 127) = .983$ ,  $p = .45$ , the estimated population standard deviation was used in the following t-tests. Subsequent t-tests revealed choice effects in all four groups, indicated by unweighted group means that were significantly different from zero: in the ownership expectation/post-processing and pre-choice group,  $M = 0.22$ ,  $t(33) = 3.65$ ,  $p < .001$ , 95% C.I. [0.10, 0.35]; in the ownership expectation/post-choice group,  $M = 0.22$ ,  $t(33) = 3.59$ ,  $p < .001$ , 95% C.I. [0.09, 0.34]; in the no ownership expectation/post-processing and pre-choice group,  $M = 0.27$ ,  $t(32) = 4.36$ ,  $p < .001$ , 95% C.I. [0.14, 0.40]; and in the no ownership expectation/post-choice group,  $M = 0.22$ ,  $t(33) = 3.65$ ,  $p < .001$ , 95% C.I. [0.10, 0.35]. The means were again in the expected positive direction, indicating higher levels of self-object associations for the chosen object than the rejected object.

### 2.5.2.2 Explicit Evaluations

Preliminary analyses indicated that Picture Position did not influence the results on explicit evaluation and was therefore not included in the analyses. Explicit evaluation scores were submitted to a 2 (Ownership Expectation, with vs. without, between Ss)  $\times$  2 (Time of Measurement, post-processing/pre-choice vs. post-choice, between Ss)  $\times$  2 (Object Status, chosen vs. rejected, within Ss) mixed-model ANOVA. The analysis yielded a significant main effect of Object Status,  $F(1, 131) = 87.11$ ,  $p < .001$ ,  $\eta_p^2 = .40$ , indicating that explicit evaluations of the chosen object ( $M = 3.49$ ,  $SD = 1.20$ ) were more positive than explicit evaluations of the rejected object ( $M = 2.60$ ,  $SD = 1.10$ ). No other effects were significant, all  $ps > .05$ .

### 2.5.3 Discussion

The main goals of Study 5 were to examine the effects of ownership expectation and the indication of choice on self-object associations. Contrary to the predictions, neither factor was found to influence self-object associations. The results did indicate a choice effect on self-object associations in the entire sample as well as in each condition, replicating the findings from previous studies.

Despite the improved manipulation of ownership expectation over Study 4's, no effect of this factor was found on self-object associations and explicit evaluations. On the other hand, the results in the no ownership expectation conditions indicate that pre-choice processing may lead to the formation of self-object associations even without the knowledge of ownership, a finding consistent with the notion that pre-choice processing changes the representation of the choice alternatives.

The finding in the no-ownership-expectation and post-processing/pre-choice condition<sup>7</sup> is particularly interesting. Because a choice effect was observed when participants did not have ownership expectation and before they indicated their preferences, it suggests that preference-driven information processing is sufficient for the choice effect on self-object associations. This “mere-processing” effect resembles the implicit partisanship effect (Greenwald, Pickrell, & Farnham, 2002), where individuals' mere-processing of the names of a group's members leads to implicit likings and identification of the group, even when the individuals have no relation with the group. The finding challenges the necessity of ownership propositions in the formation of self-object associations, as participants in this particular condition did not have ownership expectation and therefore could not have formed ownership propositions. However, it would be premature to conclude that propositions are unnecessary in the process of self-object association

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<sup>7</sup> Note that in this condition, participants had completed pre-choice processing before they took the measure of self-object associations. Therefore, the choice effect found in this condition is more likely to be caused by pre-choice processing than by pre-existing differences in self-object congruence between the two alternative objects.

formation, as participants could have inferred from the choice scenario other types of propositions other than ownership propositions. For example, they might draw propositional inferences such as “I choose this object”, in which the concept of “I” and that of the object are meaningfully related. The role of propositional processes in self-object association formation needs to be examined in future research.

No evidence of post-choice processing was found in the study, as the same levels of self-object association and explicit evaluations were found before and after the indication of choice. In other words, there was no post-choice spreading-of-alternatives effect on explicit evaluations. This finding speaks against dissonance-driven post-choice processing, and indicates that post-choice processing drives the effects of choice on explicit evaluations and self-object associations. The absence of post-choice cognitive dissonance in the present research may have to do with the negative valence of the choice alternatives. Post-choice dissonance may not occur when the choice alternatives are of negative valence (e.g., due to a lack of motivation to justify the choice). An important goal of future research should be identifying the boundary conditions for post-choice dissonance and post-choice processing.

### 3 General Discussion

The goal of the present research is to understand how ownership influences self-object associations: mental associations between the owners' selves and the owned objects.

Adopting the structural properties and operating principles of the unified theory (Greenwald et al., 2002), it was argued that a key determinant for the formation of self-object associations is the relation between the representation of the self and that of the object. Therefore, in order to understand how ownership affects self-object associations, it is important to understand the information processing that takes place in ownership scenarios, and how it changes the representation of an owner's self and that of the owned object.

Two different ownership scenarios: mere-ownership and ownership-by-choice, were sampled for this purpose. The mere-ownership scenario represents the type of situation where the level of information processing of the alternatives is minimal, so that the formation of self-object associations is passively determined by pre-existing levels of self-object congruence. The ownership-by-choice scenario, in contrast, represents the type of situation where the level of information processing is relatively high, so that the formation of self-object associations is influenced by active changes in the representations of the choice alternatives caused by choice-related information processing. Drawing on these assumptions, it was predicted that self-object association formation should be moderated by the levels of self-object congruence or incongruence of the alternative objects in the mere-ownership scenario, in that it occurs only when the objects are congruent with the self but not when they are incongruent with the self. In the ownership-by-choice scenario, however, choosing the owned object should lead to the formation of self-object association even when the alternative objects are incongruent with the self.

The findings have supported the predictions. Specifically, findings from Studies 1 and 2 indicate a moderating effect of valence on self-object associations in mere-ownership scenarios, that a mere-ownership effect on self-object associations was found in the condition where the alternative objects are of positive valence (i.e., evaluatively

congruent with the self) but not when they are of negative valence (i.e., evaluatively incongruent with the self). Findings from Studies 2 and 3 indicate moderating effects of choice on self-object associations with negative objects as choice alternatives.

Ownership-by-choice effects, but not mere-ownership effects, were found for negative objects. The same ownership-by-choice effect on self-object associations for negative objects has been replicated in Studies 4 and 5.

Although the findings from Studies 4 and 5 fail to indicate any effect from the psychological factors of interest (e.g., self-relevance, indication of choice) on self-object associations, they still provide interesting insights. The findings from Study 4 indicate increased levels of explicit preference of the chosen object over the rejected object caused by the physical ownership of the chosen object, which has no effect on self-object associations. Drawing on the assumption that the self-object association is determined by underlying representations, these findings imply that the certain psychological factors (e.g., self-enhancement motivation) that influence explicit judgments do not lead to correspondent changes in the underlying representations of the alternative objects. The findings from Study 5 indicate that pre-choice processing for the purpose of developing a preference, instead of post-choice processing for the purpose of justifying the choice, is the main determinant for the formation of self-object associations in the present research, at least when the choice alternatives are of negative valence.

In the following sections of the chapter, the current model of self-object association formation will be revisited and several important questions raised during the research will be addressed. Then, alternative accounts will be discussed in relation to the current findings. The findings will be further discussed in light of the unified theory, dual process models of social cognition, choice theories, and other relevant theories. The chapter will end with discussions of limitations of the present research, future directions, and practical implications.

### 3.1 Current model

The current model of self-object association formation included two steps. The first step is the inference of ownership propositions from ownership scenarios. The second step is

the formation of self-object associations in the owners' associative networks under the pressure created by the ownership propositions. In the second step, two principles: balance-congruity and imbalance-dissonance (Greenwald et al., 2002) guide the formation of self-object associations. According to these principles, self-object association formation should be facilitated by the level of congruence between the owners' representations of the self and the representation of the object. Not only do the findings of the present research support key predictions derived from the current model, they also raise important questions that will be addressed in this section.

### 3.1.1 Necessity of ownership propositions

The findings have challenged the notion that ownership propositions are necessary for the formation of self-object association. In Study 5, it was found that, even without introducing ownership, the evaluations of objects and the indication of one's preference of one object over the other is sufficient to create a choice effect similar to the ownership-by-choice effect on self-object associations. In other words, neither the knowledge of ownership nor the actual ownership of the object is a necessary condition for the formation of self-object association. The necessity of the first step of the model, therefore, has been challenged.

There are two responses to this challenge. First of all, just because self-object association can be formed in situations that do not involve ownership proposition does not mean that ownership proposition does not play a role in the formation of self-object association in ownership scenarios. Ownership propositions are embedded in the ownership scenarios in the present research, where participants received written instructions about their prospective ownership of an object. As long as individuals are aware of their relation with the object, there should be ownership propositions (De Houwer, 2014). Hence, ownership propositions are an inherent part of the current model. Second, as discussed in Study 5, just because ownership propositions are not necessary for the formation of self-object associations does not rule out the possibility that other types of propositions have played a similar role of creating a situational force for self-object association. It remains the goal of future research to examine the role of propositions in the formation of self-object or self-other associations in different types of scenarios.

### 3.1.2 Assessment of self-object congruence and incongruence

The concept of self-object congruence and incongruence plays a crucial role in the current model as the antecedents for the facilitation and inhibition effects, respectively, on self-object association formation. An important unanswered question, however, is how an object is assessed in terms of its level of congruence or incongruence with the self. There are, arguably, two aspects to this question. The first aspect has to do with operating principles, that is, the rules or principles that the assessment of self-object congruence follows (Gawronski, Strack, & Bodenhausen, 2009; Gawronski, Sherman, & Trope, 2014). Two types of principles have been defined in Gawronski et al. (2009, also see Gawronski & Bodenhausen, 2006). *Associative principles* are characterized by the automatic activation of mental representations or evaluative tendencies (e.g., attitudes) regardless of whether the persons consider the representations as accurate/inaccurate or the evaluations as true/false. *Propositional principles*, in contrast, are characterized by the syllogistic inferences from the inputs of activated mental representations or evaluative tendencies, and the assignment of truth values to the inferred propositions. According to this framework, the assessment of self-object congruence may follow both principles. A feature-matching model (see e.g., Hodges, Bruininks, & Ivy, 2002; Houston, Sherman, & Baker, 1991), for example, would suggest that the level of self-object congruence is contingent on the amount of features shared between the representation of the object and that of the self. This account implies that the assessment of self-object congruence is determined by the bottom-up activation of representation of the object and therefore guided by associative principles. A hypothesis-testing model (see e.g., Klayman & Ha, 1987; Snyder & Swann, 1978), in contrast, may suggest that individuals form a priori hypothesis about the degree of congruence or incongruence between an object and the self. Subsequently, they may engage in selective search for features within the representation of the object that confirm this hypothesis. This process, as it starts with a propositional hypothesis, follows propositional principles. Instead of being mutually exclusive, the two models may each work under specific conditions, and an important goal of future research is to identify the exact boundary conditions in which each model applies.



The second aspect of the question has to do with operating conditions (Gawronski et al., 2014), that is, whether the assessment of the level of self-object congruence for an object operates in a controlled or an automatic manner (Bargh, 1994). If self-object congruence/incongruence is determined by the bottom-up activation of the representation of the object, then automatic processes may play an important role. Previous research has shown that certain properties of the object, such as attitudes (Pratto & John, 1991), approach/avoidance tendencies (Cacioppo, Priester, & Berntson, 1993), and mortality salience (Amir, Foa, & Coles, 1998) are automatically activated. These properties may further facilitate a categorization of the object as either congruent or incongruent with the self, which may occur automatically (Smith, Fazio, & Cejka, 1996). If self-object congruence/incongruence is determined by top-down hypothesis testing, then motivational processes and controlled processes (e.g., biased search for hypothesis-confirming information, see Kunda, 1990) may be important.

All in all, in order to understand the operation principles and conditions for self-object congruence assessment, it is important for future research to identify the exact processes involved. This goal is important not only for the current model, but also for other models that rely on similar processes of congruence/incongruence evaluation. Mussweiler (2003), in his model of social comparison, proposed that an early step of social comparison involves a quick and holistic assessment of the similarity or dissimilarity between a target and a standard. This process was described as quick, broad, and relying on a small number of features (e.g., category membership and salient characteristics). For another example, the model of inductive reasoning (e.g., Heit, 2000) includes a key step of the assessment of similarities and dissimilarities between exemplars for the determination of whether different exemplars belong to the same category or different categories. In both cases, the underlying mechanisms for the judgment of similarity are poorly understood. Future research on the operating principles and conditions of self-object congruence, therefore, can provide insights to various important phenomena of social psychology.

### 3.1.3 Operation of the two principles

The two operating principles—balance-congruity and imbalance-dissonance, according to the way they were phrased in the unified theory (Greenwald et al., 2002) and in the current model, include antecedent conditions (i.e., self-object congruence or incongruence) and outcomes (i.e., the facilitatory or inhibitory effects on self-object association formation). It is not clear, however, how the two principles operate. The two principles are, by definition, associative principles, as the antecedent conditions are defined in terms of pre-existing associative structures and the outcomes are defined in terms of changes in the associative network (Greenwald et al., 2002). It can also be speculated that the two principles operate in an automatic manner, such as efficiently, outside of awareness, and free of intentional control (Bargh, 1994). However, since the exact mediating processes between the antecedent conditions and outcomes are not specified in the principles, there is room for alternative accounts, which may achieve the same input-output functions without relying on the same assumptions as the two principles (e.g., assumptions about the structure and operation of the associative network). These alternative accounts will be discussed in details in the next section.

## 3.2 Alternative accounts

Three alternative accounts are discussed. The single-process propositional account challenges the notion that findings of the current research are mediated by changes in the associative network. Instead, it suggests that the findings can be explained by propositional processes. The self-enhancement account, on the other hand, challenges the assumption that the findings from the ownership-by-choice scenario are caused by choice-related information processing and the resultant changes in representations. Instead, it suggests that these findings can be explained by self-enhancement motivation. Similarly, the psychological reactance account suggests that the findings can be explained by the motivation to restore autonomy. These accounts challenge key assumptions in the current model with regard to the underlying processes of the formation of self-object associations.

### 3.2.1 Single-process propositional account

The single-process propositional model of associative learning (De Houwer, 2009; De Houwer, 2014; Mitchell, De Houwer, & Lovibond, 2009) rejects the idea of associative representations and instead proposes that all information, including social knowledge, is stored in the form of propositions—beliefs of the status of the environment and the world. According to this approach, changes in behaviours (e.g., attitudes) reflect changes in underlying propositions. For example, the evaluative conditioning (EC) effect (De Houwer et al., 2001) is explained by the propositions about the contingency between the conditioned stimulus (CS) and the unconditional stimulus (US), which the individuals formed during the experience of CS-US pairings (see De Houwer, 2014). The associative accounts of the EC effect (e.g., Sternberg & McClelland, 2012), in contrast, explain the effect as mediated by mental associations between the CS and US that are formed as the result of CS-US pairings. According to the single-process propositional account, the ownership effects in the present research are behavioural effects instead of effects on mental associations. These effects can be described as enhanced tendencies to categorize the owned object as associated with the self, mediated by ownership propositions such as “I own this object” or “I choose to own this object”.

The main shortcoming of the single-process account is that, in order to explain the specific findings of the present research, it needs post-hoc assumptions on (a) how the variables of interest (e.g., object valence or choice) influence the specific content of propositions, and (b) how the content of propositions influence the behavioural tendency to categorize the owned object as a part of the self. For example, in order to explain the finding that this tendency is mediated by object valence in the mere-ownership scenario, it can be assumed that the owner has propositionally denied the ownership. Denial propositions such as “I am given this object but I do not want it” may eliminate the tendency to categorize an object as a part of the self. For another example, in order to explain the findings that the same tendency was found with negative objects in the ownership-by-choice scenario, it can be assumed that the owners infer qualitatively different propositions from this scenario as compared to the mere-ownership scenario. Propositions such as “I choose this negative object because I prefer it over the other one”

may enhance the tendency to categorize an object as a part of the self. Post-hoc explanations like these make the single-process propositional account non-falsifiable, as any behavioural effect can have a post-hoc propositional explanation. In order for the account to generate testable hypotheses about the topics of the present research, there needs to be a model that contains a priori defined conditions about (a) how certain ownership-related variables influence the content of propositions, and (b) how the specific content of propositions influences the tendency to categorize the owned object as part of one's self. The findings of the present research may serve as useful starting points towards such a model.

### 3.2.2 Self-enhancement motivation

Beggan (1992) suggested that the original mere-ownership effect—improved explicit evaluation of the owned object as compared to the non-owned object—is a function of self-enhancement motivation, or in other words, maintaining a positive sense about oneself. He also argued that a key to the understanding of the mere-ownership effect is the psychological association between the owner and owned object. Therefore, a larger ownership effect on self-association may indicate a higher level of self-enhancement motivation. This account provides a seemingly reasonable explanation for the finding of moderating effect of object valence on self-object associations in the mere-ownership scenario: The formation of self-object associations is inhibited in the negative objects condition but not in the positive objects condition, because negative objects are less effective than positive objects in helping individuals to maintain a positive view of themselves. It, however, has problems in explaining the findings in the ownership-by-choice scenario, as it cannot explain why a negative object is capable of fulfilling the goal of self-enhancement when it's chosen by the individual but not when it is randomly assigned to the individual. It should also be pointed out that Beggan's (1992) mere-ownership effect was found on explicit evaluations, and that whether or not self-enhancement motivation influences self-object associations remains an empirical question, as indicated by the findings from Study 4.

Despite the difficulties of the self-enhancement account in explaining the current findings, it is still an interesting question how self-enhancement motivation may

influence self-object associations, due to the way self-enhancement motivation is typically manipulated. In previous research (e.g., Heatherton, Herman, & Polivy, 1991; for a review, see Leary, Terry, Allen, & Tate, 2009), a common way of manipulating self-enhancement motivation involves the activation of negative contents in a person's self-representation (e.g., providing bogus negative feedback about one's performance or asking a person to recall experience with negative connotations for self-evaluation). These so-called "ego-threat" manipulations have been shown to enhance self-enhancement motivation, which should subsequently drive individuals to own positive objects that are arguably more effective for self-enhancement than negative objects. However according to the current model, the negative content activated in the active representation of the self will increase the level of self-object congruence for negative objects. Therefore, such "ego-threat" manipulation should also facilitate the formation of self-object association for negative objects. In other words, individuals may be motivated to own a positive object but are at the same time more likely to form a mental association with a negative object—an interesting dissociation. Future research can further explore the dissociation between the "need" to own an object and the mental associations between the self and an object.

### 3.2.3 Psychological reactance

According to the psychological reactance theory (Brehm, 1966), individuals tend to have an aversive affective response when they perceive a deprivation of freedom due to imposed rules. In order to restore their deprived autonomy, the individuals will engage in specific thoughts and behaviours such as opposition to the imposed rules, unfavourable attitudes toward the imposed behaviours, and unfavourable attitudes toward the source of restriction (Buller, Borland, & Burgoon, 1998; Quick & Stephenson, 2008; Dillard & Shen, 2005; Miller, Lane, Deatrick, Young, & Potts, 2007). This is particularly relevant to the present research in that the mere-ownership scenario involves participants being forced to accept a gift. According to the theory, these participants may perceive the entire situation as a deprivation of their freedom of choice and experience psychological reactance. Accordingly, the moderating effect of valence on the mere-ownership effects can be explained by the presumably higher degrees of psychological reactance in the

negative objects condition than that in the positive object condition. The moderating effect of choice on the mere-ownership effects can be further explained by the lack of psychological reactance when participants have the freedom to choose between two alternatives.

These explanations, convincing at the first glance, appear flawed when under scrutiny. First, according to the reactance theory, the degree of psychological reactance should be a function of the degree of deprivation of freedom and not a function of object valence in the mere-ownership scenario. Whether or not object valence in the mere-ownership scenario influences the degree of perceived deprivation of freedom remains an empirical question. Second, the theory did not specify how psychological reactance may influence self-object associations. With this mechanism missing, it is impossible for the psychological reactance theory to generate any testable hypotheses about self-object association formation. Future research can further explore the role of psychological reactance in the mere-ownership scenario, and contribute to theoretical refinements of the psychological reactance theory.

### 3.2.4 Summary

The single-process propositional theory, a self-enhancement motivation model, and a psychological reactance model were discussed as potential alternative accounts to the findings of the present research. As illustrated, these alternative accounts suffer from similar problems, as all of them lack a priori defined boundary conditions and effects, and therefore rely on specific post-hoc assumptions to explain the current results. In contrast, the current model contains a priori defined antecedents and effects, and generates testable hypotheses that have been supported by the findings. These are strong reasons to prefer the current model over the alternative accounts.

## 3.3 Theoretical implications

### 3.3.1 Unified theory

As the current model drew key assumptions from the unified theory (Greenwald et al., 2002), the findings have supplemented and extended the unified theory in many ways. In

the unified theory, an important yet untested assumption was that the associative network of social knowledge will resist the formation of an association between two concepts that could lead to a concept being associated with both of two bipolar-opposed nodes. This prediction is tested in the present research and supported by the finding that for a negative object, the formation of self-object association was inhibited, as such an association would lead to the exact associative structure described in that assumption.

Novel experimental designs above and beyond the ones used in the empirical evidence for the unified theory (Greenwald et al., 2002) are introduced. Previous studies cited in support of the unified theory involved a complex correlational design called balanced identity, in which association strengths are measured instead of being manipulated. Had the same balanced identity design been adopted in the studies of the present research, it would involve (a) the examination of a triad of concepts that include the self, the owned object, and the attribute of valence; (b) the measurement of the three associations that link all pairs of the three concepts; (c) manipulation of object valence, so that subjects are expected to vary in the valence of their owned object, and (d) use of statistical tests for predicted patterns of how varying degree of object valence influences the three associations simultaneously. As compared to this highly complex design, the experimental designs used in the present research were kept simpler and more straightforward, in that they involved (a) direct manipulations of the key boundary conditions (balance-congruity and imbalance-dissonance) of the unified model and (b) measures that directly tap into the strength of mental associations between selves and objects.

The present research also expanded the unified theory (Greenwald et al., 2002) in the methods through which two incongruent concepts may form an association. According to the unified theory, the only situation in which two incongruent concepts can be associated is when there are sustained or repeated influences from the environment. Such associations, once formed, will lead to an adaptive change in the associative structure called “differentiation” (p.6). To illustrate this, recall the example in which a person’s cousin was married to a former criminal. The forced association between the person and the former criminal will lead to the concept representing the former criminal to split into

two subconcepts: one as the spouse of cousin and one as a former criminal. One subconcept: the spouse of cousin is associated with positive valence as well as with the person's self, while the other: a former criminal is associated with negative valence but not with the person's self.

The current model suggests that another way to form an association between two incongruent concepts is through active changes in the representation of concepts, a process that resembles the process of reappraisal in emotional regulation (Gross, 2002). An example can be seen in Finch and Cialdini's (1989) study, where participants, after being told that they shared the same birthday with a notorious dictator, indicated improved positive attitudes towards the dictator. According to the current model, the shared birthdays have changed the participants' representations of the dictator in a way that increased the level of congruence between the participants' selves and the dictator. The resultant association between participants' selves and the dictator may have further mediated the positive attitudes towards the dictator through automatic valence transference.

Finally, the notion that the formation of an association between two concepts depends on the active representations of the two concepts has interesting implications for and beyond the unified theory (Greenwald et al., 2002). It implies an associative network that is more flexible and dynamic as compared to the one specified in the unified theory, as the mental association between two concepts is determined by constructive activations of stored representations of the concepts, instead of by the stored representations per se.

### 3.3.2 Dissonance model

When it comes to the post-choice dissonance model (Festinger, 1957, 1964), it is important to note that the signature finding for post-choice dissonance: post-choice spreading-of-alternatives on explicit evaluations, was not found in Study 5. The findings indicate that the effects are driven by pre-choice processing, while no evidence was found on the role of post-choice processing in changing self-object associations. However, the possibility that post-choice processing influences self-object associations cannot be ruled



out, as the null findings might be associated with specific settings of the present research, such as the inclusion of negative objects as choice alternatives.

It remains an interesting question whether or not biased post-choice processing can influence self-object associations at all. As discussed in Chapter 1, post-choice cognitive dissonance (Festinger, 1957, 1964) can lead to two forms of post-choice processing: re-evaluations of the choice alternatives and selective exposure to information about positive aspects of the chosen object and negative aspects of the rejected object. It is possible that selective exposure to choice-confirming information can change the representations of the choice alternatives and subsequent changes in self-object associations. Because participants in the present research were never offered the opportunity of selective exposure, the possibility needs to be examined in future research by providing participants with additional information about the positive and negative aspects of the alternative objects. If, in this case, the participants indicate a stronger ownership-by-choice effect, then the findings will provide support for the role of post-choice processing and for the classic post-choice cognitive dissonance model.

### 3.3.3 Choice Theories

The current findings have supported the notion that choice has the property of expressing thoughts, preferences, and identities (Kim & Sherman, 2007; Tafarodi, Mehranvar, Pantou, & Milne, 2002). They suggest that not only can choice integrate an object into a person's representation of self, it can also stamp a personal mark on the representation of the object. The findings also highlight the effects of pre-choice processing in terms of changing the choice makers' representations of the alternative objects. However, they are silent about whether or not the pre-choice processing is biased, that is, driven by the specific goal to favour one object over the other (Brownstein, 2003). The possibility that such biases exist and influence the findings of the current study cannot be ruled out.

An interesting question is whether or not the pre-choice processing of unattractive alternatives is different from the pre-choice processing of attractive alternatives. It is possible, for example, that the choice between two attractive alternatives may involve a strategy of maximizing attractive features, which corresponds to a frame of maximizing

gains. In contrast, the choice between two unattractive alternatives may involve a strategy of minimizing unattractive features, which corresponds to a frame of avoiding losses (e.g., Tversky & Kahneman, 1986). Fischer, Jonas, Frey, and Kastenmüller (2008) found that participants who had made a gain-framed decision tended to engage in stronger biased post-choice information processing than those who had made a loss-framed decision. They suggested that gain-framed decisions are made with increased subjective decision certainty that increases biased post-choice processing. If a choice between two negative objects involves a loss-framed decision, then the findings by Fischer et al. may explain the absence of evidence for post-choice processing in Study 5. Future research can further investigate the relation between object valence, type of framing, and choice-related information processing.

## 3.4 Limitations and future directions

### 3.4.1 Object content

The use of animal pictures as positive and negative objects was inspired by several considerations. First, the category of objects needed to be controlled between different conditions. Pictures of animals represented an ideal example in this regard because it was relatively easy to identify animal pictures of positive and negative valence in the IAPS. Second, the cover story for the ownership scenarios (i.e., giving out a printed picture as a special gratitude of the participants' participation) had to be plausible, especially in the conditions where the alternatives are negative objects. Toward this end, participants were told that two alternative pictures were randomly selected from a collection called "Nature and Wild Life". Otherwise, it would have made little sense to give participants a snake picture (or any picture of negative valence) as a free gift.

The content of pictures may limit the generalizability of the current findings. Snake pictures contain features beyond negative valence, such as mortality salience (see Koole & Van den Berg, 2005), which have limited their representativeness as negative objects. Specifically, the mortality salience of snakes can trigger psychological processes over and above those triggered by general negative objects, such as ugly buildings. The research on terror management theory (e.g., Pyszczynski, Greenberg, & Solomon, 1999)

has shown that stimuli with mortality salience can trigger defense mechanisms, such as the automatic motivation to suppress the evoked death thoughts. How these defense mechanisms may influence the formation of self-object association remains an empirical question. From a different perspective, however, mortality salience could have increased the level of self-object incongruence for the snake pictures and therefore enhanced the construct validity of the present research. Future research needs to test the generalizability of the findings to other types of positive and negative objects.

### 3.4.2 Significance of choice

In the present research, participants in the ownership-by-choice scenario were asked to choose between two animal pictures as a gift. Despite the prospective ownership, most participants might have perceived the scenario as a trivial one, given the lack of value of the gift and the lack of importance of the situation. On the one hand, the fact that reliable ownership-by-choice effects were found despite the possibly low levels of choice significance can be viewed as supporting evidence for the validity of the obtained effects. On the other hand, the possibly low levels of choice significance could have limited the current research in certain ways. First of all, it might have limited the depth of information processing during choice. In the current model, it was assumed that that choice-related information processing involves the search for evaluation standards within one's self-system as well as the examination of the choice alternatives along these standards. Therefore, the more significant the choice, the more likely the individuals will look into their own self-system for standards as well as examine the choice alternatives thoroughly along these standards, which should further lead to higher levels of self-object congruence for the chosen object. Secondly, it might have contributed to the null effects of ownership expectation and the indication of choice in Study 5. It is possible that the insignificance of the choice has led to a floor effect for ownership expectation, as well as the absence of post-choice dissonance and post-choice processing. After all, why should participants feel dissonant about such a trivial choice? If the choice outcome is more significant (e.g., by using a gift of higher value), the effects of certain psychological factors on self-object associations might become more identifiable. Future research is needed to test this possibility.

### 3.4.3 Valence vs. congruence

In the present research, the focus on object valence as a determinant of self-object congruence and incongruence has led to the functional equivalence between positive/negative valence and the congruence/incongruence with the self, respectively. The underlying assumption was that for most participants, positivity is included in the representation of the self. One may question, accordingly, whether the findings are driven by object valence or by self-object congruence. In order to empirically address this question, future research needs to recruit samples of individuals with chronic negative representations of the self (e.g., those with low self-esteem), which is difficult according to previous research. A more practical way is to change individuals' active representations of the self through experimental procedures such as bogus feedback of failure (Heatherton et al., 1991), selective retrieval (e.g., Peters & Gawronski, 2011), or priming methods (see Wheeler et al., 2005).

### 3.4.4 Value of self-object association

As the present research is focused on self-object association, one may wonder to what extent this construct is relevant for other psychological processes and behaviours. First, the formation of self-object associations is information for the formation of other types of associations within the associative network specified in the unified theory (Greenwald et al., 2002). Therefore, the findings on self-object association formation are informative to the understanding of a variety of topics such as attitudes, stereotypes, and self-esteem from an associative network perspective. Second, just as self-other associations predict marital satisfaction, relationship commitment, and psychological well-being (Aron, Aron, & Smollan, 1992), self-object associations may predict important psychological factors with regard to objects, such as brand loyalty, consumer satisfaction, or purchasing decisions. An important direction of future research should be to explore the behavioural effects of self-object associations.

### 3.4.5 Effects of ownership on self

The previous discussion on valence transference has been focused on the transference from the self to an associated object, while theoretically it is possible to happen in the

other direction: from an associated object to the self. An association with a positive object should lead to enhanced positive feelings towards the self, while an association with a negative object should lead to a detrimental effect on the positive feelings towards the self. Moreover, ownership of positive and negative objects may also cause motivational effects, which may influence the owner's explicit evaluations of the self. For example, owning a positive object may boost one's positive image, while owning a negative object may pose an ego-threat and lead to enhanced motivation for self-enhancement. Future research needs to explore the effects of ownership on the owner's both explicit and automatic evaluations of the self.

## 3.5 Real-world Implications

### 3.5.1 The psychology of ownership

The distinction between ownership propositions and self-object associations may have interesting real-world implications. Drawing on a parallel distinction between evaluative judgments and gut feelings from the APE model (Gawronski & Bodenhausen, 2006), it is possible for people to have factual ownership of an object yet feel a sense of disconnection with the object. A straightforward example is a person receiving a gift that he or she does not like (e.g., a fan of Mazda receives a Toyota car as a birthday gift). The current findings further indicate that the search for likeable features within this object (e.g., looking for Mazda features within the Toyota), however, may reduce the feeling of disconnection and increase the feeling of connection. Future research can examine (a) whether or not individuals have conscious access to self-object associations, (b) the dynamic interactions between perceived ownership and self-object association, and (c) the processes through which individuals cope with the tension between perceived ownership of an object and the feeling of disconnection towards the object.

### 3.5.2 Evaluation vs. association

The present research also implies a distinction between positive evaluation and self-object associations. The positive or negative feelings about the object might be independent with the extent to which an object is a part of one's self. For example, when visiting a museum, a person may judge a painting as good looking, yet at the same time

feel disconnected with the painting as certain features of it (e.g., the subject, the color, etc.) are incongruent with the person's self. A person may also feel inexplicably connected with a painting that looks bad, as certain aspects of the painting resembles certain aspects of the person's self. The two concepts: liking and self-object association may lead to distinct affective and behavioural outcomes, which may provide directions for future research.

### 3.5.3 Value of choice

The current findings imply that even a choice between disliked objects can lead to a feeling of connection with, and improved attitude towards, the chosen object. This notion has interesting implications for marketers. It might be a useful strategy to integrate the component of choice into marketing messages, especially when considering the possibility that the perceivers may not like the products or the messages. This strategy can arguably elevate the perceivers' sense of control, increase their levels of information processing of the alternative products or marketing messages, and enhance the mental associations between their selves and the relevant products.

### 3.5.4 Self-regulation

Finally, the present research may provide insights on how individuals manage the negative aspects of their selves. It is possible that people behave differently towards negative objects or concepts integrated with their selves than similar objects or concepts that are not parts of their selves. For example, previous research has found that people like their own body odours while finding others' body odours repelling. How people manage the negative aspects of themselves might be an interesting topic for researchers who are interested in the dynamics of the self-system.

## 3.6 Conclusions

The present research is the first to examine one of the oldest types of human-object relation—ownership—from the one of the latest perspectives in social psychology—implicit social cognition. Utilizing the classic mere-ownership paradigm, the free-choice paradigm, and reaction-time based measures, the studies tested boundary conditions for

self-object association formation in two types of ownership scenarios: mere-ownership and ownership-by-choice. As discussed, the theoretical model and empirical findings of the present research have shed light on a variety of topics and theories in social psychology, as well as suggested new paradigms and measures for future studies. The discussion of the findings has also raised interesting questions for future research on the psychology of ownership, self, or other topics such as consumer behaviours. As a real-world implication, the findings suggest that it might be a good idea to provide people with options, especially when there is a chance that they might not like the options they are provided with. After all, when Mazda lovers can only choose between a Honda and a Toyota, they may still end up feeling connected to the ones that they chose.

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## Appendix A: Documentation for Ethics Approval



**Department of Psychology** The University of Western Ontario



### Use of Human Subjects - Ethics Approval Notice

<b>Review Number</b>	09 09 19	<b>Approval Date</b>	09 09 24
<b>Principal Investigator</b>	Bertram Gawronski/Kurt Peters/Yang Ye	<b>End Date</b>	10 04 30
<b>Protocol Title</b>	How do we form first impressions and evaluations?		
<b>Sponsor</b>	n/a		

This is to notify you that The University of Western Ontario Department of Psychology Research Ethics Board (PREB) has granted expedited ethics approval to the above named research study on the date noted above.

The PREB is a sub-REB of The University of Western Ontario's Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario. (See Office of Research Ethics web site: <http://www.uwo.ca/research/ethics/>)

This approval shall remain valid until end date noted above assuming timely and acceptable responses to the University's periodic requests for surveillance and monitoring information.

During the course of the research, no deviations from, or changes to, the protocol or consent form may be initiated without prior written approval from the PREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of research assistant, telephone number etc). Subjects must receive a copy of the information/consent documentation.

Investigators must promptly also report to the PREB:

- a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- b) all adverse and unexpected experiences or events that are both serious and unexpected;
- c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to the PREB for approval.

Members of the PREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the PREB.



Clive Seligman Ph.D.

Chair, Psychology Expedited Research Ethics Board (PREB)

The other members of the 2008-2009 PREB are: David Dozois, Bill Fisher, Riley Hinson and Steve Lupker

CC: UWO Office of Research Ethics

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Department of Psychology The University of Western Ontario

Use of Human Subjects - Ethics Approval Notice

<b>Review Number</b>	09 09 19	<b>Approval Date</b>	09 09 24
<b>Principal Investigator</b>	Bertram Gawronski/Kurt Peters/Yang Ye	<b>End Date</b>	10 04 30
<b>Protocol Title</b>	How do we form first impressions and evaluations?		
<b>Sponsor</b>	n/a		

This is to notify you that The University of Western Ontario Department of Psychology Research Ethics Board (PREB) has granted expedited ethics approval to the above named research study on the date noted above.

The PREB is a sub-REB of The University of Western Ontario's Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario. (See Office of Research Ethics web site: <http://www.uwo.ca/research/ethics/>)

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Investigators must promptly also report to the PREB:

- a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- b) all adverse and unexpected experiences or events that are both serious and unexpected;
- c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to the PREB for approval.

Members of the PREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the PREB.

Chair, Psychology Expedited Research Ethics Board (PREB)

The other members of the 2008-2009 PREB are: David Dozois, Bill Fisher, Riley Hinson and Steve Lupker

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**Department of Psychology** The University of Western Ontario

**Use of Human Subjects - Ethics Approval Notice**

<b>Review Number</b>	13 02 05	<b>Approval Date</b>	13 02 05
<b>Principal Investigator</b>	Dick Sorrentino/Yang Ye	<b>End Date</b>	13 04 30
<b>Protocol Title</b>	A study of decision making and consumer experience		
<b>Sponsor</b>	n/a		

This is to notify you that The University of Western Ontario Department of Psychology Research Ethics Board (PREB) has granted expedited ethics approval to the above named research study on the date noted above.

The PREB is a sub-REB of The University of Western Ontario's Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario. (See Office of Research Ethics web site: <http://www.uwo.ca/research/ethics/>)

This approval shall remain valid until end date noted above assuming timely and acceptable responses to the University's periodic requests for surveillance and monitoring information.

During the course of the research, no deviations from, or changes to, the protocol or consent form may be initiated without prior written approval from the PREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of research assistant, telephone number etc). Subjects must receive a copy of the information/consent documentation.

Investigators must promptly also report to the PREB:

- a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- b) all adverse and unexpected experiences or events that are both serious and unexpected;
- c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to the PREB for approval.

Members of the PREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the PREB.



Clive Seligman Ph.D.

Chair, Psychology Expedited Research Ethics Board (PREB)

The other members of the 2012-2013 PREB are: Mike Atkinson (Introductory Psychology Coordinator), Rick Goffin, Riley Hinson Albert Katz (Department Chair), Steve Lupker, and TBA (Graduate Student Representative)

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Principal Investigator: Prof. Bertram Gawronski  
 File Number: 104748  
 Review Level: Delegated  
 Protocol Title: Quick Categorization, Action, and Consumer Choice  
 Department & Institution: Social Science Psychology, Western University  
 Sponsor:  
 Ethics Approval Date: January 16, 2014 Expiry Date: April 30, 2014

## Documents Reviewed &amp; Approved &amp; Documents Received for Information:

Document Name	Comments	Version Date
Western University Protocol	Original Received Nov 28 2013	
Other	Received Dec 20 2013. Debriefing form	2013/12/20
Instruments	Received Dec 20 2013. Instruments	2013/12/20
Revised Letter of Information & Consent	Received Dec 20 2013. Revised LOI and consent	2013/12/20
Recruitment Items	Received Dec 20 2013. Revised recruitment materials	2013/12/20

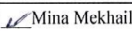
This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The NMREB is registered with the U.S. Department of Health & Human Services under the JRB registration number IRB 00000941.

## Ethics Officer to Contact for Further Information

Grace Kelly	Vikki Tran	 Mina Mekhail	Erika Basile
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## Use of Human Participants - Initial Ethics Approval Notice

**Principal Investigator:** Prof. Bertram Gawronski  
**File Number:** 104772  
**Review Level:** Delegated  
**Protocol Title:** How do we make quick categorization?  
**Department & Institution:** Social Science\Psychology, Western University  
**Sponsor:**  
**Ethics Approval Date:** January 03, 2014 **Expiry Date:** April 30, 2014

**Documents Reviewed & Approved & Documents Received for Information:**

Document Name	Comments	Version Date
Instruments	Materials for the study	2013/12/04
Recruitment Items	Recruitment poster	2013/12/05
Other	Debriefing Form	2013/12/05
Western University Protocol		2013/12/10
Other	Summary of changes	2013/12/21
Revised Letter of Information & Consent	Revised LOI and Consent	2013/12/21

This is to notify you that The University of Western Ontario Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the applicable laws and regulations of Ontario has granted approval to the above named research study on the approval date noted above.

This approval shall remain valid until the expiry date noted above assuming timely and acceptable responses to the NMREB's periodic requests for surveillance and monitoring information.

Members of the NMREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the NMREB.

The Chair of the NMREB is Dr. Riley Hinson. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.



to Contact for Further Information

Grace Kelly	Vikki Tran	Mina Mekhail	Erika Basile
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## Curriculum Vitae

**Name:** Yang Ye

**Post-secondary Education and Degrees:** Beijing Normal University  
Beijing, China  
1999-2003 B.Sc.

Beijing Normal University  
Beijing, China  
2003-2006 M.Ed.

The University of Western Ontario  
London, Ontario, Canada  
2006-2008 M.Sc.

The University of Western Ontario  
London, Ontario, Canada  
2008-2014 Ph.D.

**Honours and Awards:** Western Graduate Scholarship  
2006-2012

**Related Work Experience**

Teaching Assistant  
The University of Western Ontario  
2006-2012

Research Assistant  
The University of Western Ontario  
2006-2014

Part-time Instructor  
The University of Western Ontario  
2012-2013

### Publications:

Ye.,Y., & Gawronski, B. (in press). Contextualization of mental representations and evaluative responses: A theory-based analysis of cultural differences. In J. Spencer-Rodgers, & K. Peng (Eds.), *The psychological and cultural foundations of East Asian cognition: Contradiction, change, and holism*. New York, NY: Oxford University Press.

Gawronski, B. & Ye, Y. (in press). Prevention of intention invention in the affect misattribution procedure. *Social Psychological and Personality Science*.

Gawronski, B., Ye, Y., Rydell, R. J., & De Houwer, J. (2014). Formation, representation, and activation of contextualized attitudes. *Journal of Experimental Social Psychology, 40*, 3-15.

Gawronski, B., & Ye, Y. (2014). What drives priming effects in the affect misattribution procedure? *Personality and Social Psychology Bulletin, 40*, 3-15.

Norman, R. M. G., Sorrentino, R. M., Windell, D., Ye, Y., & Szeto, A. C. H. (2010). Predicting behavioural intentions to those with mental illness: The role of attitude specificity and norms. *International Journal of Social Psychiatry, 56*, 239-254.

Norman, R. M. G., Sorrentino, R. M., Gawronski, B., Szeto, A. C. H., Ye, Y., & Windell, D. (2010). Attitudes and physical distance to an individual with schizophrenia: The moderating effect of self-transcendent values. *Social Psychiatry and Psychiatric Epidemiology, 45*, 751-758.

Norman, R. M. G., Gawronski, B., Hampson, E., Sorrentino, R. M., Szeto, A. C. H., & Ye, Y. (2010). Physical proximity in anticipation of meeting someone with schizophrenia: The role of explicit evaluations, implicit evaluations, and cortisol levels. *Schizophrenia Research, 124*, 74-80.

Sorrentino, M. R., Ye, Y., & Szeto, A. C. H. (2009). Uncertainty management: To fear of not to fear? *Psychological Inquiry, 20*, 240-244.

### **Poster Presentations**

Ye, Y., Gawronski, B., & Sorrentino, R. M. (2014, February). *Feeling “connected” with a snake: Effects of object valence, ownership, and choice on implicit self-object association*. Poster presented at the 2014 Annual Conference of Society for Personality and Social Psychology, Austin, Texas, USA.

Ye, Y., & Gawronski, B. (2014, February). *Prevention of Intention Invention in the Affect Misattribution Procedure*. Poster presented at the Social Cognition Preconference for the 2014 Annual Conference of Society for Personality and Social Psychology, Austin, Texas, USA.

Ye, Y., Rotman, J., Sorrentino, R. M., Dalke, K., & Szeto, A. C. H. (2012, January). *When do automatic associations predict explicit judgments? Moderating effects of uncertainty orientation and feeling/knowledge-focused deliberation*. Poster presented at the 2012 Annual Conference of Society for Personality and Social Psychology, San Diego, California, USA.

Ye, Y., Szeto, A. C. H., Sorrentino, R.M., Dalke, K., Nezelek, J., Yasunaga, S., Kouhara, S., Wang, Z., & Jin, S. (2011, May). *Differences in trait, daily, and performance emotional complexity in East-Asian and North-American students*. Poster presented at the 2011 Annual Conference of Society for the Study of Motivation, Washington DC, USA.

Norman, R. M. G., Gawronski, B., Hampson, E., Sorrentino R.M., Szeto, A., & Ye, Y. (2010, June). *Physical proximity in anticipation of meeting someone with schizophrenia: The role of explicit evaluations, implicit evaluations, and cortisol levels*. Poster presented at the 2010 Annual Research Day of Department of Psychiatry at Schulich School of Medicine and Dentistry, Western University, London, Ontario, Canada.

Ye, Y., Sorrentino, R. M., Wang, Z., & Jin, S. (2009, January). *Uncertainty regulation, affiliation motivation, and daily social life events across cultures*. Poster presented at the 2009 Annual Conference of Society for Personality and Social Psychology, Tempa, Florida, USA.

### Conference Talks

Ye. Y., Li, Y., & Norman, R. (2014, June). *Can information videos reduce stigmatization of schizophrenia? It depends on the content*. Talk presented at the 2014 Academic Research Day of Department of Psychiatry at Western University, London, Ontario, Canada.

Ye. Y., Norman, R., Sorrentino. R., Hampson, E., & Rotman, J. (2012, June). *Effects of negation and affirmation training on implicit stereotypes and behaviours related to schizophrenia*. Talk presented at the 2012 Academic Research Day of Department of Psychiatry at Western University, London, Ontario, Canada.

Ye. Y., & Gawronski, B. (2013, May). *Effect of Mere Ownership and Free Choice on Implicit Self-Object Associations*. Talk presented at the 2013 University of Waterloo–Western University Social Psychology Conference, Waterloo, Ontario, Canada.

Ye. Y., & Gawronski, B. (2010, May). *Will I like it just because I own it? Testing the boundaries of mere-ownership effects*. Talk presented at the 2010 University of Waterloo–Western University Social Psychology Conference, London, Ontario, Canada.