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Did You Invest Less Than Me? The Effect of Other's Share of Investment on Psychological Ownership of Crowdfunding Projects

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Received: 10 February 2020; Accepted: 2 March 2020; Published: 6 March 2020

Abstract: The development of information technology, in an online context, has expanded into collective consumption, e.g., crowdfunding projects. Moreover, people feel a sense of psychological ownership (“it is mine”) toward projects they invest in, even if their attributes are immaterial or intangible. This research focuses on changes in psychological ownership based on the characteristics of crowdfunding projects, which are collectively invested in with others, and the attributes of objects (tangible/intangible). Specifically, this research seeks to determine how psychological ownership is affected by information about the amount of money invested by others in a shared project. Additionally, this research investigates whether psychological ownership changes based on others’ investment (less/more) and the attributes (tangible/intangible) of the project. The findings from the empirical analysis indicate that psychological ownership changes based on information regarding other people’s investment in a shared crowdfunding project. The results also show that, in projects with tangible attributes, psychological ownership changes based on investment information; however, no changes were observed in projects with intangible attributes.

Keywords: psychological ownership; share of investment; crowdfunding; tangibility

1. Introduction

As information technology advances, patterns of consumption are increasingly shifting from offline to online space. For example, in the past, people bought cassette tapes and CDs to listen to music and DVDs to watch movies. Currently, consumers can listen to music in real time through music streaming services (e.g., Apple Music, Spotify, Amazon Music, etc.) and watch movies online through movie streaming services (e.g., Netflix, Disney+, Prime Video, etc.). In other words, consumers are increasingly spending more on online content or services. Based on the theory of psychological ownership, which is the state in which individuals feel as though they are the target of ownership or that a piece of the target object is “theirs”, people experience a sense of ownership when they invest money, time, and effort into a particular object (tangible/intangible) [1,2]. Consequently, psychological ownership in a consumer group has a positive effect on their satisfaction, continued usage, willingness to pay more, and e-loyalty for online services such as online communities, online games, music streaming services, and social media [3–6]. In other words, increasing the psychological ownership of users of online services is essential and a major issue for service providers because it can affect consumer attitudes toward continuous use, satisfaction, etc.

Another new consumption trend is that collaborative investment in shared objects is increasing online through services as part of the sharing economy. Through the use of digital platforms, the user has the experience of sharing specific targets with others, such as sharing houses (e.g., Airbnb) and

cars (e.g., Uber, Lyft), as well as crowdfunding (e.g., Kickstarter, Indiegogo) [7–9]. Representatively, crowdfunding is a way to raise money from a large number of people through online platforms, such as the Internet, for the purpose of funding projects, startups, or businesses with various objectives [10,11]. In this case, how do consumers have psychological ownership of an object shared with others? With the expansion of digital platforms, the sharing economy is growing steadily, and the tendency to invest with others in the same target will also become more and more interesting. Thus, this study's empirical analysis of relative investments that change may provide important clues to the future growth of a shared economy. For example, suppose you have a collaborative investment with other people on a shared target. If you invested \$100 into the target, it would generally feel worth \$100. However, how will your psychological ownership of the object change if you find out that others invest more (or less) than you on average? Regarding these research questions, previous studies on psychological ownership mainly focused on a single subject; however, this study expands previous research to investigate the psychological ownership of a shared subject. Moreover, psychological ownership has been mainly discussed in terms of intrinsic motivation [12–14]. This study investigates the influence of external factors (others' information) on an individual's psychological ownership.

There are various types of crowdfunding projects, ranging from movies, musicals, and web-toons to ideas, products, automobiles, etc. However, they can typically be classified as tangible/intangible. Tangible objects have a specific, defined form, a substance that can be visually confirmed, and is easily divisible into its components based on individuals' needs. For example, in the case of a robot, a consumer can divide the robot into arms, legs, and a head, and further detailed classification can be performed without difficulty. In contrast, for intangible objects, their entirety is linked to a single narrative and while it is possible to divide this narrative into parts (beginning, development, climax, resolution), the division is not clear, and it is difficult to make detailed distinctions. Thus, do changes in the psychological ownership of an object, caused by others' investment information, differ based on the object's attributes? This study attempts to solve this research question based on Yan [15] research, which states that there is a difference in the evaluability of tangible and intangible objects. Few studies examine the relationship between psychological ownership and an object's attributes. Jussila et al. [16] suggest that the attributes of objects (e.g., tangibility, visibility, manipulability, etc.) are important variables that control psychological ownership and the consequences of psychological ownership. As digitalization changes, the object of ownership increasingly shifts from tangible to intangible, which has recently led to the exploration of the nature of the object. However, there is still a lack of empirical analysis of the nature of psychological ownership and objects. This study was undertaken focusing on tangibility (tangible/intangible) among the target attributes presented by Jussila, Tarkiainen, Sarstedt, and Hair [16].

This study aims to identify relative changes of psychological ownership caused by information regarding others' investment in collectively invested objects and investigates whether there is a difference in psychological ownership that changes depending on others' investment (less/more) and the attributes (tangible/intangible) of the object. This study involves two experiments. Specifically, in the first experiment, each of the three groups that perceived less investment than others (less condition), more investment than others (more condition), and equal investment as others (baseline condition) were compared through empirical analysis. In the second experiment, further analysis was performed using a 2 (relative investment: less condition vs. more condition) $\times$ 2 (target attribute: tangible vs. intangible) factorial experimental design to test the hypotheses.

The remainder of this study is organized as follows: Section 2 presents the literature review and our hypotheses. Section 3 describes the methodology, including experiment design, participants, procedure, and measurement. Section 4 provides the empirical results, followed by a discussion of the findings of each experiment. Finally, Section 5 presents the conclusions, including theoretical and practical implications, limitations, and suggestions for future research.

2. Literature Review and Hypotheses Development

2.1. Psychological Ownership in the Online Context

Psychological ownership is defined as a state in which an individual feels as though a target of ownership or a piece of that target is “theirs”. Psychological ownership appears in not only tangible objects but also intangible objects [1,2]. The conceptual core of psychological ownership is how closely relevant the object is to an individual and how psychologically tied he/she is to the object [17]. Pierce, Kostova and Dirks [1] identified three dimensions governing psychological ownership: (1) controlling the target, (2) getting to know the target intimately, and (3) investing one’s self in the target. Factors that develop psychological ownership have mainly been used in the context of employees’ attitudes and behaviors in an organization, but can also be applied in an online context.

First, controlling the target refers to the ability to control, manipulate, or use a particular object as desired by oneself. In the online context, it is possible for a user to freely manipulate a game character or improve a player’s control cognition, thereby improving the user’s loyalty and psychological ownership [4]. Zhao, Chen and Wang [3] revealed that the perceived control of users in the context of social media (e.g., LINE) has a positive effect on psychological ownership and consequently leads to continued usage and willingness to pay more. Moreover, Danckwerts and Kenning [18] stated that, in online streaming, users’ perceived control is positively related to music-based psychological ownership. Second, getting to know the target intimately means that an individual has to relate to his/her possessions by getting to know the object and feeling intimacy toward it. In an online context, the intimacy of users can be increased by allowing them to continue using a particular service and know more about the service. For example, social media platforms (e.g., LINE, Facebook etc.) offer innovative tools, applications, and games in addition to their basic function of sharing information with others, thereby increasing user interaction and connection frequency [3]. In other words, the interaction between a user and a service, and the user’s deeper involvement in the service refers to becoming familiar with the service [18,19], which leads to a higher psychological ownership of the service. Finally, investing the self in the target refers to an individual investing money, time, energy, effort, and attention into an intangible/tangible target. Investing in a target can take many forms such as psychological and intellectual energy, e.g., time and ideas, as well as physical forms and physical energy such as money [16]. Recently, due to the increasing switch to the virtual (online) world, time and money are increasingly being invested in intangible objects such as online content (e.g., social networking services (SNS), online games, music streaming services, etc.) rather than tangible objects. In this context, online service providers offer various incentives and encourage consumers to spend extensive amounts of time and effort on their services.

Psychological ownership theory, which began with employee attitudes and behaviors in an organization, has recently been extended to various fields such as psychology, business, consumerism, marketing, and even information systems [3,20–23]. However, psychological ownership is typically limited to a single target. Recently, with advances in information technology, the pattern of collaborative consumption in the online context has increased [24,25], and the objects of psychological ownership have also been extended from single objects to shared objects. Therefore, this study focuses on the point at which psychological ownership appears toward an object shared with others in an online context and investigates changes in the psychological ownership of objects collectively invested in.

2.2. Changes in Psychological Ownership Based on Others’ Investment

Psychological ownership studies have mainly dealt with the intrinsic motivation of individuals [1,2,5,16]. As mentioned earlier, three factors (e.g., controlling the target, getting to know the target intimately, and investing one’s self in the target) play a major role in developing psychological ownership [3]. These factors can be thought of as the behaviors or experiences that an individual has toward an object. Previous studies have examined changes in psychological ownership arising from external factors, not internal factors. This external aspect was emphasized because both

the development of technology as well as the interest in collaborative consumption and shared objects have increased as part of the sharing economy [25]. As the amount of time people spend online in their daily lives increases, it becomes easy to identify content and platforms that can promote shared psychological ownership in the online context—car sharing (e.g., Zipcar), accommodation share (e.g., Airbnb), collaborative online encyclopedias (e.g., Wikipedia), content sharing (e.g., YouTube, Instagram), and crowdfunding services (e.g., Kickstarter) [26–28].

This situation can be considered as a group-level phenomenon rather than an individual-level one. Consumers can have collective psychological ownership of a shared target. Therefore, psychological ownership is directly related to the distribution of the investment in the object or the share ratio. In other words, when an individual is considered to have possession of an object, psychological ownership can be subjectively evaluated by an external factor (e.g., others). For example, when a consumer invests \$100 in a particular crowdfunding project, the consumer has psychological ownership of the project's objects. The consumer's psychological ownership will be worth \$100, the amount invested in the object. At this point, if the consumer finds out that others are investing an average of \$150 in the target, he/she will feel that he/she has invested less in the project than others and thus has a relatively low share ratio for the target. Since the consumer will feel that others contributed more to the object than they did, he/she will view psychological ownership of the object as lower than the \$100 he/she invested. Conversely, when the consumer finds that others have invested \$50 on average, he/she will feel that he/she has contributed more or has a higher share ratio in the project than others. Thus, the consumer will have greater psychological ownership than invested. Thus, if a consumer invests a certain amount of money in an object and then comes to know how much others have invested, he/she will numerically compare his/her investment with that of others. The results of this comparison will lead to a consideration of the ownership of or contribution to the object, resulting in a change in psychological ownership. Therefore, we propose the following hypothesis.

Hypothesis 1. *The psychological ownership of an object changes depending on the information regarding others' investment. That is, when investors learn that they have invested more (vs. less) than others, their psychological ownership is higher (vs. lower) than when they invest the same amount as others.*

2.3. The Effect of Others Investment on Psychological Ownership Depending on Target Attributes

In recent years, studies focusing on the object of psychological ownership have gradually emerged. For example, the study by Viglia et al. [29] shows that psychological ownership mediates the effects of product attributes (hedonic vs. utilitarian) on consumers' cheating behavior. As a result, the study found that the perceived psychological ownership is lower for hedonic goods and increased consumers' cheating behavior through verifying mediation analysis. This study attempts to classify the object's attributes tangibly, as the target of psychological ownership can not only be tangible (e.g., material things) but intangible (e.g., immaterial things) as well [1,2]. Jussila, Tarkiainen, Sarstedt, and Hair [16] suggested that the targets of psychological ownership can be classified in various ways based on six criteria (e.g., tangibility, visibility, openness, attractiveness, accessibility, and manipulability), which must be discussed in future studies. Tangibility refers to the ability to be accessed through the senses and be touched [30]. Specifically, tangible objects have physical entities and are capable of being handled, touched, or felt, and not abstract or imaginary. In contrast, intangible objects do not have a physical presence and cannot be touched.

Projects presented on crowdfunding platforms are distinguishable from tangible objects (e.g., robot cleaners, travel bags, etc.) and intangible objects (e.g., performances, movies, cartoons, etc.). In the case of tangible objects, the physical appearance of an object can be visually identified, and since the shape of this object is clearly presented, it can be separated into parts. For example, in the case of a project for producing a robot, it is easy to distinguish the individual parts, such as the arms, legs, and torso, of the robot. Conversely, in the case of intangible objects, the project does not have a physical presence. Additionally, it is not clear whether to divide each part and it is difficult to

distinguish between them in detail. Moreover, intangible objects are generally connected to one story (e.g., introduction, development, turn, and conclusion). For example, in the case of a performance, it is difficult to sub-divide it into specific parts because it is linked to a beginning, a development, a climax, and a resolution, four steps in composition.

An object's attributes affect a consumer's evaluation of its value. Tangible objects are easily measurable because the entity is clearly presented. However, intangible objects can make it difficult for consumers to evaluate them in their decision-making processes [31]. According to Yan [15] in research regarding the evaluability and reliance on the absolute ($x-y$) versus relative difference (x/y), the evaluability a particular subject affects the consumers' ability to rely on absolute or relative differences in numerical comparisons. Evaluability means the extent to which consumers can make sense of the value of objects. When consumers can easily evaluate the attributes of objects and have clear reference information (e.g., a tangible target), they can rely on the absolute numerical difference. Based on these previous studies, in the case of high-evaluability tangible objects, consumers will rely on absolute numerical differences and will be more sensitive to information about others' investment. In contrast, in the case of low-evaluability intangible objects, consumers are more likely to rely on relative differences. Thus, no matter how much others have invested, they do not have a significant impact on the psychological ownership of the object they invest. Hence, absolute numerical comparisons can affect psychological ownership; this effect disappears if the evaluability of the subject becomes low. Therefore, the following hypothesis is presented.

Hypothesis 2. *As intangibility increases, the effect of changes in psychological ownership based on the relative investment of others will disappear.*

3. Experiment 1

Experiment 1 aimed to identify the relative change in psychological ownership caused by information regarding others' investment in collectively invested objects. In other words, this experiment investigated how psychological ownership is affected by information about the amount of money invested by others in a shared project.

3.1. Research Method for Experiment 1

3.1.1. Experiment Design and Participants

A total of 88 participants (48.90% female, $M_{\text{age}} = 35.64$, SD (Standard Deviation) = 5.30) completed the experiment via a two-week online survey. They were randomly assigned to one of three conditions—baseline (same investment), less investment, and more investment. The participants were given a certain reward for their participation.

3.1.2. Procedure and Measurement

The participants were asked to carefully read the instructions for the survey first and then complete the survey independently. Next, the participants were given a scenario wherein they invested in a subject (crowdfunding project) for producing a robot dog called "smart puppy". The actual crowdfunding service platform referred to the production of the experimental subject, and this study produced a virtual stimulus. Pictures accompanied the scenario to stimulate the feeling that the participants had actually invested in the project (See Figure 1). In all the conditions, participants invested \$100 in the project. We measured a variable to ensure that there was no difference in the amount of money assumed by participants in each condition. Additionally, we presented the same picture for each condition, while showing that the average amount that others invested in the project was different for each situation. For example, in the baseline condition, we demonstrated that participants invested the same amount as others (i.e., \$100). In the less (more) condition, participants were shown to have invested the less (more) amount than others. The less condition showed that others invested

more (i.e., \$150), making the participants perceive themselves as having invested less than others. In contrast, the more condition showed that others invested less (\$50), making the participants perceive themselves as having invested more than others (see Figure 2).

*Crowdfunding: Raising money from a large number of people using an online platform.

Suppose you are normally interested in the latest technology products and have invested in a project to produce a puppy robot through crowdfunding*. The final goal of the project is \$20,000, and you have invested \$100 in the project. At this time, you found out that other sponsors of the project invested an average of around \$150. The following is a summary of your robot dog, named the “Smart Puppy” production project.

Figure 1. Experiment Scenario.

Figure 2. Stimuli of Experiment 1 (less condition).

Following Pierce, Kostova and Dirks [2] work, two questions were used to measure psychological ownership of the invested crowdfunding project: (1) I feel a sense of ownership in the crowdfunding project, (2) I think the crowdfunding project is “mine”. The participants expressed their responses to these two statements on a seven-point Likert scale (1 = *Do not agree at all* to 7 = *strongly agree*, eigenvalue = 1.83, Cronbach’s $\alpha = 0.91$). To confirm that the baseline/less/more conditions caused by perceived relative investment were manipulated as intended, the following two items were included: (1) I have invested a relatively higher amount of money for this crowdfunding project than for others, (2) I have more shares in this crowdfunding target than others (1 = *Do not agree at all* to 7 = *strongly agree*, eigenvalue = 1.90, Cronbach’s $\alpha = 0.95$). Additionally, a control test was conducted as the amount invested in the project could affect psychological ownership depending on how valuable it was to the participants. To measure the value of the amount invested in the object, the following item was included: “I think it would be appropriate to invest \$100 in the crowdfunding project” (1 = *Do not agree at all* to 7 = *strongly agree*) Thus, the value of the amount invested in the subjects (projects) did not show a significant difference between groups ($F(2,83) = 1.06, ns$).

3.2. Results of Experiment 1

3.2.1. Manipulation Check

We utilized an analysis of variance (ANOVA) test to conduct a manipulation check for the relative investments and observed a significant effect in each group ($M_{\text{baseline}} = 3.29$ vs. $M_{\text{less}} = 2.64, F(1,55) = 5.16, p < 0.05$; $M_{\text{baseline}} = 3.29$ vs. $M_{\text{more}} = 5.26, F(1,56) = 31.04, p < 0.01$). Thus, the manipulation check

was performed successfully and showed differences in the perceived amount according to information regarding others' investment.

3.2.2. Hypotheses Test

We conducted an ANOVA to confirm whether changes in psychological ownership are caused by information regarding others' investment. As seen in the Figure 3, the results revealed that the more-condition group was perceived as having invested more than others and having greater psychological ownership than the baseline-condition group who were perceived as having invested the same amount as others ($M_{\text{more}} = 4.69$ vs. $M_{\text{baseline}} = 4.05$, $F(1,56) = 4.47$, $p < 0.05$). In contrast, the less-condition group were perceived as having invested less than others and having lesser psychological ownership than the baseline-condition group ($M_{\text{less}} = 3.05$ vs. $M_{\text{baseline}} = 4.05$, $F(1,55) = 8.06$, $p < 0.01$). These findings indicate that, although each group invested the same amount in a subject, psychological ownership could be affected by knowing information about the amount of money invested by others. Thus, hypothesis 1 was supported.

Figure 3. Relative Change in Psychological Ownership Caused by Information regarding Others' Investment in Collectively-Invested Objects.

Additionally, we examined whether the information regarding others' investment amount affected not only psychological ownership but also attitudes toward the crowdfunding project. To measure attitudes toward the project, three items were measured: like, favorable, and good (1 = *Do not agree at all* to 7 = *strongly agree*, eigenvalue = 2.79, Cronbach's $\alpha = 0.96$). Consequently, the more-condition group showed a better attitude toward the crowdfunding project than the less-condition group, and these results were statistically significant ($M_{\text{more}} = 4.89$ vs. $M_{\text{less}} = 3.50$, $F(1,55) = 16.39$, $p < 0.01$).

3.3. Discussion of Experiment 1

This experiment examined how psychological ownership is affected by information about the amount of money invested by others in a shared project. The results show that the participants perceived to invest less than others had a much lower psychological ownership than the baseline condition. Conversely, participants perceived to have invested more than others had a much higher psychological ownership than the baseline condition. The difference was greater in the baseline and less conditions than in more condition. This can be interpreted as a loss-aversion tendency, based on the

endowment effect, wherein people are more sensitive to losses than they can gain [32]. Unlike previous studies that focused only on a single object, this experiment is meaningful in that it focuses on shared objects. However, from the perspective of the target attributes, this study is limited in that confines the experimental subjects only to tangible objects. According to Jussila, Tarkiainen, Sarstedt, and Hair [16], the attributes of the object are presented as factors that can control the consequences of psychological ownership—tangibility, visibility, openness, attractiveness, accessibility, and manipulability. In other words, different results may appear depending on the object of psychological ownership. This experiment focused on the tangibility of the object (e.g., robot puppy). How is it different for intangible objects? For example, for movies, plays, cartoons, etc., it is not easy to separate their composition like a tangible object. Therefore, the following experiment involves adding an intangible target to ensure that the relative effects mentioned above appear similarly for intangible objects.

4. Experiment 2

Experiment 2 aimed to investigate whether changes in psychological ownership arising from knowing about others' investment (less/more) differ according to the attributes (tangible/intangible) of the shared object.

4.1. Research Method for Experiment 2

4.1.1. Experiment Design and Participants

Experiment 2 sought to verify whether there was a difference in psychological ownership that changes with information about others' investment amount based on the attributes of the object. A 2×2 factorial design was developed for this experiment. The independent variables were relative investment (less vs. more) and project attributes (tangible vs. intangible). A total of 124 people participated in the survey. The average age was 34.77 years, and 50.8% of the participants were male. Similar to Experiment 1, a \$5 reward was given to each participant.

4.1.2. Procedure and Measurement

This experiment replicated the previous experiment's method except that intangible subjects (projects) were added as a new scenario (See Figure 4) in the survey and the baseline condition was excluded. The subjects of the experiment were crowdfunding projects for online cartoon (i.e., webtoons: web cartoon) production. Participants were presented with scenarios for each condition. The measurement items were the same as those in Experiment 1 and items for manipulating tangible/intangible objects were added. To manipulate the object's attributes, the following three items were included: The crowdfunding project (1) has a physical appearance, (2) has a part that can be clearly distinguished, and (3) can be touched (1 = *Do not agree at all* to 7 = *strongly agree*, eigenvalue = 2.48, Cronbach's $\alpha = 0.89$).

WebToon 'Crowd' Project

The goal of the project is \$ 20,000

You have invested **\$100** to the WebToon Crowd project

Others have invested around **\$150** to the WebToon Crowd project

Thank you or your sponsorship

Figure 4. Stimuli of Experiment 2 (less condition).

4.2. Results of Experiment 2

4.2.1. Manipulation Check

An ANOVA was used to check whether the project's attributes were manipulated as intended. As expected, the results indicate that participants presented with a tangible subject scored higher on tangible attributes (e.g., more obvious, physical, and touch) than participants presented with an intangible subject ($M_{\text{tangible}} = 5.04$ vs. $M_{\text{intangible}} = 3.76$; $F(1,122) = 31.69$, $p < 0.01$). As in Experiment 1, a manipulation check on relative investment was performed, which revealed a significant difference in each group ($M_{\text{less}} = 2.70$ vs. $M_{\text{more}} = 4.63$; $F(1,122) = 55.60$, $p < 0.01$). Thus, all manipulations were successful.

4.2.2. Hypotheses Test

A two-way ANOVA was conducted to test hypothesis proposed above. Psychological ownership was measured using two items (eigenvalue = 1.81, Cronbach's $\alpha = 0.89$), which were averaged and used for the analysis. Table 1 shows the descriptive statistics of psychological ownership toward the crowdfunding project and Table 2 shows the results of the ANOVA test.

Table 1. Descriptive statistics of psychological ownership in Experiment 2.

Project Type	Relative Investment	Mean	Std. Deviation	N
Tangible	Less	3.05	1.41	28
	More	4.69	1.05	29
Intangible	Less	3.74	1.34	34
	More	3.73	1.45	33

Table 2. ANOVA test on psychological ownership in Experiment 2.

Source	Sum of Squares	Degree of Freedom	Mean Square	F-Value	p-Value
Corrected Model	43.547	5	8.709	4.980	0.000
Intercept	50.491	1	50.491	28.871	0.000
Gender	0.932	1	0.932	0.533	0.467
Age	4.632	1	4.632	2.649	0.106
Project Type (Tangible vs. Intangible)	0.727	1	0.727	0.415	0.520
Relative Investment (Less vs. More)	20.186	1	20.186	11.542	0.001
Project Type $\times$ Relative Investment	22.629	1	22.629	12.940	0.000
Error	206.363	118	1.749		

The ANOVA test results indicate that the participants' gender and age had no effect on psychological ownership. The main effect of relative investment was significant ($p < 0.01$) but transaction type was not significant. Additionally, the interaction effects of project type and relative investment were significant—a result that requires further analysis. The interaction effect can be seen in the graph below (Figure 5). Similar to Experiment 1's results, for tangible projects (e.g., smart puppy), participants had a higher psychological ownership in the more condition ($M = 4.69$) than in the less condition ($M = 3.05$; $F(1,55)$, $p < 0.01$). However, as expected, for intangible projects (e.g., Webtoon), there was no statistically significant difference between each condition ($F(1,65) = 0.01$, $p = 0.98$). Therefore, Hypothesis 2 was accepted.

Figure 5. Interaction Effect of Project Type $\times$ Relative Investment.

4.3. Discussion of Experiment 2

Experiment 2 investigated whether there is a difference in psychological ownership that changes with information about others' investment amount based on the attributes (tangible/intangible) of the objects in crowdfunding. As per the analysis results, for the tangible projects, psychological ownership of the object was changed by the information of others. However, this change did not appear for intangible projects. Thus, the results indicate that, as intangibility increases, the effect of changes in psychological ownership arising from information regarding others' investment weakened. This study argues that the reason for this phenomenon is that there is a difference in object attributes. Unlike intangible objects, tangible objects have a distinct physical appearance, are distinguishable from each other (e.g., arms, legs, head, etc.), and can be touched. Therefore, consumers may find it easier to evaluate a tangible target compared to an intangible object and may be willing to measure its value. In a similar vein, the value of a type of target is sensitive even when an individual knows information about others' investment; however, there may be no change for intangible objects.

5. Conclusions

This study aimed to investigate changes in psychological ownership caused by information regarding others' investment in collectively invested objects and determine whether there is a difference in psychological ownership that changes depending on the investment amount of others (less/more) based on object attributes (tangible/intangible). The results of Experiment 1 showed that psychological ownership changes due to information about others' investment and participants who found out that they invested less than others showed less psychological ownership of the object than the baseline condition. In contrast, participants who found that they invested more than others showed greater psychological ownership of the object than baseline condition. Interestingly, the difference between the baseline and less conditions were greater than the difference between the baseline and more conditions. This can be explained by the endowment effect caused by the loss-aversion tendency of humans. According to the endowment effect, people tend to value potential losses more than potential gains. In this context, the reason for the ownership gap between the groups in Experiment 1 can be sufficiently

inferred. In Experiment 2, the subject was expanded from tangible to intangible objects. As expected, the investment of others did not cause changes in the psychological ownership of intangible subjects; this may be due to the nature of the object. Tangible objects are more easily assessed than intangible ones. Intangible attributes are less likely to be assessed and so the influence of external information is reduced in these situations.

This research makes several contributions to theory. First, it identified that psychological ownership could be formed jointly in shared projects. Previous studies have focused mainly on psychological ownership of a single subject at the individual level. In our study, we empirically analyzed the crowdfunding platform to demonstrate collective psychological ownership. With technological advances, sharing and collective consumption in the online context will continue to increase, and psychological ownership issues will become more important [24,33,34]. In this study, we attempted to study psychological ownership at the group level in the crowdfunding platforms. Second, we found that changes in psychological ownership caused by investment relativity was weakened for intangible objects. Previous research on psychological ownership focused primarily on physical goods but recently there has been a gradual shift to digital goods and services. Pierce and Jussila [35] state that the attributes of objects, such as attractiveness, accessibility, openness, and manipulability, are closely linked to psychological ownership. In this study, we argued that it is not easy to judge the value of an intangible object based on its attributes since it is difficult to distinguish between parts of the object sensitively and in detail.

Our research has some practical implications. First, according to our analysis, if an individual is perceived to have invested more money than others, his/her psychological ownership improves. For online service providers, it is important for customers to have psychological ownership of the service because users with high psychological ownership have a positive influence on revisit intention, participation, satisfaction, and loyalty [3,5,36]. Therefore, it is important for service providers or project creators to develop maximum psychological ownership for users in the project. In other words, no matter how much a user invests in the subject, they should be perceived as having the highest possible psychological ownership. It is expected that psychological ownership can be fully utilized in various areas in line with the researches that derive interesting insights based on recent consumer sentiment [37–44]. Second, Experiment 2 suggests that the greater the intangibility, the less the effect of relativity of investment. This implies that the greater the intangibility, the harder it is to perceive the value of the object. This is somewhat consistent with Atasoy and Morewedge [12], who argued that physical products have higher value than digital products because of perceived controls based on physical product attributes. Therefore, to enable users to obtain the right value for digital content, which is an intangible object, it may be important to maximize its validity, even if it is intangible. For example, in a project to produce a play, the play is presented by dividing it into certain parts (early, mid-, and late-stage). In a similar vein, it may be necessary to ensure that the users of intangible objects are perceived as having invested time and effort and have made contributions to the object, since its value may be weaker than that of a tangible object.

Despite these implications, our research has some limitations. In a crowdfunding environment, the best way is for participants to invest directly; however, we created a virtual experiment environment and presented it to the participants. We presented scenarios to explain the situation to the participants and followed similar projects on an actual crowdfunding platform. However, our experiments were limited because the participants did not actually invest. Nonetheless, in our analysis, psychological ownership was clearly distinguished between the groups and was judged to be a statistical value sufficient to explain the intention of this study. Second, there is a question as to whether the tangible/intangible objects selected in our experiments can be generalized. Future research needs to expand upon our findings using various tangible/intangible objects. Finally, all of our participants live in the Republic of Korea. It is unclear whether the relative changes in psychological ownership and attributes of objects apply to other cultures. Therefore, we suggest that future research examine various populations of consumers and systematically explore more cultural features.

Author Contributions: B.-G.S. designed the model and built the logic for the hypotheses. D.-H.P. analyzed the data and carried out the insights and implementation. Both authors shaped the research and provided essential feedback and discussion. All authors have read and agreed to the published version of the manuscript.

Funding: This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2017S1A5A8018751).

Acknowledgments: B.-G.S. thanks Hyunsook Oh and Jae-Hyun Seo for unlimited support, and D.-H.P. thanks Yoonhee Hwang, Chaehee Park, and Chanhee Park for insightful and helpful comments.

Conflicts of Interest: The authors declare no conflicts of interest.

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