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The Impact of Availability Heuristic, Regret Aversion, Self-control, and Certainty and Disposition Effects on the Ethical Intentions of Real Estate Agents

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This study primarily adopts a behavioral economics approach to investigate how the availability heuristic, regret aversion, self-control, and the certainty and disposition effects impact the ethical intentions of real estate agents. A statistical analysis is performed with structural equation modeling. The participants are real estate agents in Kaohsiung City, Taiwan. Of the 1000 questionnaires administered from May 13 to June 10, 2023, 668 were returned. After removing 27 invalid responses, the effective recovery rate is 64.1%. The empirical results show that regret aversion positively impacts the disposition effect, self-control negatively impacts the disposition effect, the certainty effect positively impacts the disposition effect, and the disposition effect negatively impacts ethical intentions. Therefore, regret aversion, self-control, and the certainty effect indirectly impact the ethical intentions of real estate agents through the disposition effect.

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Keywords

Ethical intentions, Availability heuristic, Disposition effect, Regret aversion, Self-control, Certainty effect

1. Introduction

The real estate brokerage industry is built on trust. The general public are under the impression that real estate agents earn a lot of money. However, the general public also perceives that real estate agents deceive clients and inflate price differences to gain higher returns for their services, which are ethical problems. Ethics are often rooted in the organizational principles, values, and behavioral norms formed through personal traits or legal systems. In the legal system of Taiwan, Paragraph 1 of Article 19 of the Real Estate Brokerage Management Act states: "A brokerage agency or a broker shall not receive any price difference or other repayment. The brokerage agency should receive the standard repayment out of the actual sale price or rent specified by the central competent authority". Even with legal restrictions, the desire of real estate agents to earn large commissions and their pressure to perform well may drive them to engage in unlawful behavior, thus resulting in infrequent transactional disputes. Therefore, the behaviors of real estate agents are important for transactional impartiality. Their professional ethics are one of the factors that affect their behaviors. Real estate transactions significantly impact economies and markets as a whole and even the national economy. Therefore, a single action can have significant consequences. As such, exploring the ethical intentions that underlie the marketing process of real estate agents is important.

The literature on ethics in real estate covers discourse on ethical regulations and standards (Brinkmann, 2009; Tan, 2016) and the use of multidimensional ethics scales to explore ethical problems among real estate market professionals (Lee et al., 2024). Common approaches to examining ethics and behavioral intentions include regression analyses, paired sample *t*-tests, and analysis of variance (ANOVA; Kuo, 2013). Agboola et al. (2010) use an ANOVA to analyze the opinions and evaluations of the ethical behaviors of Nigerian real estate agents and clients. Lee (2002) examines the real estate market and professional ethics of real estate agents, and set the demographic variables as the independent variables while the dependent variables are the obligation to inform the buyer and to disclose, and a prompt response.

Previous studies on the ethical issues of real estate agents have mainly focused on the organizational culture, and business and remuneration models. For example, Lee (2002) examines the effects of business models and remuneration structures on the professional ethics of real estate agents. Tan (2016) examines the core values of organizational culture to determine the effectiveness of implementing business ethics. However, there are a lack of studies on the personal behaviors of real estate agents. Of the few, Verstraete and Verhaeghe

(2020) conduct a qualitative study which uses NVivo software to examine the behavioral intentions of real estate agents when conducting business.

Previous studies have seldom examined the ethical intentions of real estate agents through a behavioral economics approach. Shahzad et al. (2019) indicate that heuristics have a higher predictive power in explaining the investment performances of real estate agents. Horenstein et al. (2017) conduct a study on buyer-seller transactions in the real estate industry and show that when the decision-maker is affected by the availability heuristic, s/he decides based on the significance of the information during the cognitive process. Chia (2019) also shows that the certainty effect[1] is found in real estate transactions. When a certain amount of earnings is involved, people will overemphasize some options and become risk averse. Therefore, when real estate agents are influenced by the certainty effect[1] and desire higher commissions, they may fall victim to ethical risks, convey incorrect information to clients during the sales process, and convince clients to choose inappropriate products. Wikström and Svensson (2010) note that self-control[2] is thought to only to affect crime involvement when morality is low and has virtually no effect on crime involvement when morality is high. Therefore, real estate agents with more self-control are less susceptible to ethical risks. When examining regret aversion[3] and false reference points in the real estate market, Seiler et al. (2008) show that women are more likely to have regret aversion and false reference points than men.

Previous studies have seldom used the disposition effect[4] to examine the ethical intentions of real estate agents. Most have discussed the propensity of investors to sell winners and hold losers based on investment decision-making and performance, including the propensity to sell winning stocks early and

[1] The certainty effect is a psychological effect that arises from cognitive bias. Different evaluations are given for ascertained or possible outcomes. Kahneman and Tversky (1979) suggest that people tend to choose the safer option, remain conservative, and avoid risks to make a profit.

[2] Self-control is a facet of impulse control. It entails managing emotions, thoughts, and behaviors in the face of enticement and sudden desires. Thaler and Shefrin (1981) note that people may show a conflicting personality in which a rational planner and an emotional doer exist at the same time. A person with less willpower is vulnerable to making impulsive decisions when s/he is simultaneously influenced by long-term rational considerations and short-term emotional factors.

[3] First proposed by Bell (1982) and Loomes and Sugden (1982), regret aversion, also known as the regret theory, is the self-assessment of an anticipated response to a future event. Bell (1982) describes regret as the emotion that emerges when comparing the outcome or status of a specific event and the status of the choice that is about to be made.

[4] In behavioral finance research, the disposition effect shows that investors often have the propensity to sell off winning stocks in their investment portfolios and continue to hold on to losing stocks. In the real estate industry, the disposition effect occurs when real estate agents sell off more valuable or popular products ahead of less valuable and poor-selling products.

continue to hold on to losing stocks (Barber and Odean, 1999; Garvey and Murphy, 2004; Odean, 1998). This study aims to examine whether real estate agents sell winners and hold losers under the influence of the disposition effect and preferentially sell top-selling products to customers. To this end, the study further examines the influence of several behavioral economics variables (the availability heuristic, regret aversion, self-control, and the certainty and disposition effects) on the ethical intentions of real estate agents.

Structural equation modeling (SEM) is used to analyze the data and examine the structural and causal relationships between the behaviors of real estate agents and the availability heuristic, regret aversion, self-control, certainty and disposition effects, and ethical intentions. We seek to explore whether the various behaviors of real estate agents have detrimental effects on consumers and the real estate market. That is, whether the availability heuristic, regret aversion, self-control, and certainty effect significantly influence the disposition effect. Then, we further examine the influence of the disposition effect on ethical intentions, and describe the ethical intentions of real estate agents during the sales process from a behavioral economics standpoint. The findings will help consumers protect their rights and interests and avoid being deceived by real estate agents when purchasing real estate, assist in the training and management of behavioral ethics of future real estate professionals, improve the service quality of the entire real estate brokerage industry, and strengthen the industry as a whole. Note that we cite a number of investment-related studies in this paper even though our focus is on real estate agents. Our intention is not to generalize these investment-related studies to the real estate industry, but we believe the psychological mechanisms and behavioral models used in these studies can facilitate current understanding of how real estate agents make decisions when they face similar problems and challenges.

2. Literature Review and Hypotheses

2.1 Relationship between Availability Heuristic and Ethical Intentions

Sheeran and Abraham (2003) report that, based on different scenarios, the brain can store habits, preferences, experiences, and the framing effect of the default heuristic and also influence attitudes, intentions, and behaviors through the priming effect. Liu (2016) shows that an individual tends to be risk-seeking when dealing with a potential loss but is instead more risk-averse when dealing with a potential gain. The availability heuristic can be used to determine the probability of an event. A more recent event can better serve as a reference for decision-making. Slovic et al. (2004) show that difficulties in gaining the availability heuristic and memory information can form the basis for decision-making. After evoking imagination, the availability heuristic can cause bias, such as skewing from ethical judgments in real-life settings. Lee (2002) identifies market downturn and the salary structure of real estate agents as the

main reasons that affect the commission earned from real estate sales. This reduces their adherence to ethical norms in exchange for better sales, or can lead to unethical behaviors such as engaging in real estate fraud through asymmetrical information. Horenstein et al. (2017) note that when out-of-towners buy or sell farmland, pricing errors often arise due to the unethical intentions of real estate agents, asymmetrical information, and the availability heuristic. They show that the availability heuristic negatively influences ethical intentions and contributes to the price differences between local and out-of-town buyers. Liang et al. (2022) reveal that the availability heuristic might create meaningless systematic errors in decision-making. Based on the work in the literature, we propose Hypothesis 1 (H1) as follows:

H1: The availability heuristic significantly and negatively influences ethical intentions.

2.2 Relationships among Regret Aversion, Self-control, and Certainty and Disposition Effects

Lu (2003) identifies the factors of disposition effects, including value functions and, primarily, regret aversion. Chang and Chang (2007) find that the psychological variables of regret aversion influence the disposition effect in investors. Fogel and Berry (2006) use anticipated regret to interpret the disposition effect. As investors want to avoid regret in the future, they tend to sell a winning stock too soon and hold on to a losing stock too long. Hsiao and Sun (2006) show that investors engage in irrational behaviors when they worry that the price of a losing stock that they own will drop in the future. Genesove and Mayer (2001) note that loss aversion influences the choice of the seller of the posted price and his/her acceptance of the asking price.

The real estate market is often quite affected by loss aversion. The seller is motivated to set higher prices to reduce losses and gain a higher transaction price when a sale is made. Therefore, real estate brokers may deliberately take an ethical risk and post a higher price to avoid missing expected sales targets and leverage information asymmetry between consumers and salespeople to meet their expected targets.

Rajeev and Bhattacharyya (2007) describe regret as a complex emotion created through higher-level cognitive processes that can help to identify alternative solutions in decision-making. In other words, there is the desire to prevent regretful events from happening which influences ethical decision-making. Shefrin and Statman (1985) describe regret aversion as an emotional feeling associated with the ex-post knowledge that a different decision in the past would have been better than the chosen decision. Regret aversion is a factor in the disposition effect. Seiler et al. (2020) examine revert aversion and false reference points in real estate transactions and find that real estate is deeply influenced by business cycles and economic conditions. The disposition effect

of failing to make timely adjustments when real estate prices are high or low can result in disappointment and regret. Therefore, regret aversion influences the disposition effect. As such, we propose Hypothesis 2 (H2) as follows:

H2: Regret aversion significantly and positively influences the disposition effect.

Self-control was first discussed in the self-control theory of Scheier and Carver (1985), which posits that individuals will take action to minimize the gap between their goals and the actual perceived situation. Rua et al. (2017) mention that an individual with more self-control can manage their impulsiveness and replace their existing response modes to achieve goals or improve performance and eliminate harmful behaviors. They propose that self-control mediates the relationship between internal moral identity and ethical behavior. Self-control is needed to perform ethical behaviors regardless of the level of ethical identification.

Schwepker and Good (2017) agree that job pressure and unethical intentions are positively correlated. Faced with pressure to perform well in their business, real estate agents are vulnerable to unethical behaviors. However, those with more self-control can suppress unethical behaviors that result in impulsive actions. Hsiao and Sun (2006) show that self-control negatively influences the disposition effect. Niloofar (2012) states that more self-control reduces the size of the disposition effect. Schlafmann et al. (2021) report that those with more self-control issues are less likely to become homeowners because houses are non-liquid investments and mortgages need to be paid on a continuous basis. More self-control issues result in a higher disposition effect due to the presence of risk. Therefore, the degree of self-control significantly and negatively influences the disposition effect. As such, we propose Hypothesis 3 (H3) as follows:

H3: Self-control significantly and negatively influences the disposition effect.

The prospect theory in Kahneman and Tversky (1979) posits that higher weights are assigned to highly probable events and individuals tend to be risk-averse when making profits (positive prospects) but risk-taking when making losses (negative prospects). Chia (2019) study property investments and the land value of future redevelopments in Singapore. The author notes that against an opportunistic backdrop, investors would preferentially sell the real estate properties they hold rather than wait and then sell them because they prefer to profit from guaranteed high selling prices instead of taking a risk and waiting for the benefits of a possible but uncertain capital appreciation. This opportunistic behavior in which the possibility of earning money from smaller sales is preferred over waiting to earn from larger sales is an example of the disposition effect. Therefore, the certainty effect significantly and positively influences the disposition effect. We propose Hypothesis 4 (H4) as follows:

H4: The certainty effect significantly and positively influences the disposition effect.

2.3 Relationship between Disposition Effect and Ethical Intentions

Shefrin and Statman (1985) define disposition effects as a widely discussed form of bias in which winning stocks are sold too early while losing stocks are held too long. Lin and Fu (2015) examine the disposition effect in the preowned house market and find that when the market return varies, the buying/selling behaviors of investors are reflected in the trading volume. A continuous negative return in the previous period can diminish the trading volume and result in the disposition to ride losers. Hunt and Vitell (1986) explain that since personal ethical judgment entails the evaluation of behavioral rightness, personal ethical philosophy should be a key factor of personal ethical judgment. Dubinsky et al. (1980) conclude that the ethical dilemma is rooted in the conflict between the short-term pressure of meeting manager-specified sales targets and the long-term goal of achieving customer satisfaction. Under the disposition effect, the ethical intentions of real estate agents are influenced by their decision to preferentially sell top-selling products to customers. Schwepker and Good (2017) also find a positive correlation between the disposition effect and ethical intentions under the influence of job stress. Based on these studies, we propose Hypothesis 5 (H5) as follows:

H5: The disposition effect significantly influences ethical intentions.

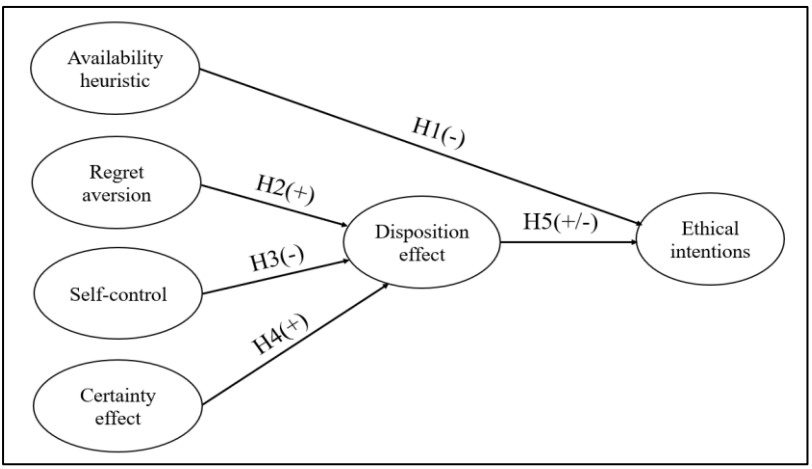
3. Study Design

3.1 Study Framework

This study uses SEM to examine the causal relationships between the availability heuristic, regret aversion, self-control, and the certainty effect (the exogenous variables), and disposition effect and ethical intentions (endogenous variables). The availability heuristic directly influences ethical intentions. We do not set a path for the availability heuristic to indirectly affect ethical intentions through the disposition effect. Regret aversion, self-control and the certainty effect do not have direct effects on ethical intentions. The relationship paths are set according to relevant studies. Although these factors are grounded in different theories in psychology and behavioral economics, they collectively constitute the psychological mechanisms and behavioral models of real estate agents in their decision-making process. More specifically, cognitive bias (the availability heuristic) and the tendency to preferentially sell top-selling products (the disposition effect) influences the ethical intentions of real estate agents. Regret aversion influences their choice of information and decision-making. Self-control and the certainty effect influence which behavioral models

they adopt in the face of risk and temptation. Regret aversion, self-control, and the certainty effect influence the disposition effect (preferentially selling top-selling products to clients). The study framework is shown in Figure 1.

Figure 1 Study Framework



3.2 Questionnaire Design

Chen (1998) notes that the availability heuristic influences individuals through previous experiences, media reports, and emotional reactions. Among them, previous experiences are the focus of this study. Chou (2007) proposes the concept of ease of recall and suggests that the likelihood of occurrence is overestimated by ease of association with events. In this study, the availability heuristic is measured by using three items under the constructs of previous experiences and ease of recall.

Regarding regret aversion, Chang (2012) notes that investors prefer to gain current benefits to minimize regret and measures regret aversion through two items. This study measures self-control by using six items under the four constructs in Tangney et al. (2004): resisting temptation or action, task performance, interpersonal relationships, and psychological adjustment.

Regarding the certainty effect, Chia (2019) notes that real estate investors tend to overlook the greater benefits in the future to avoid current risks. We develop three items to measure the certainty effect. Lin and Fu (2015) note that the disposition effect involves selling winners and holding losers. We develop four items to measure the disposition effect. We also develop three items to measure ethical intentions based on the definition of behavioral intentions in Lee and Yu (2007) and Jones (1991) that ethical intentions are the actions taken based on ethical judgment (Table 1).

Table 1 Questionnaire Items and Literature Sources

Construct	Questionnaire Item	Source
(1) Availability Heuristic		
Previous Experiences	1. I recommend the sales price to my clients based on previous transactions.	Chen (1998), Chou (2007)
	2. I often sell the products I have based on previous experiences.	
Ease of Recall	1. I do not trust the real estate brokerage industry due to the allegedly negative experiences reported by my peers.	
(2) Regret Aversion		
Regret Aversion	1. I regret preferentially providing products with better qualities to clients.	Chang (2012)
	2. I regret preferentially providing products with less superior qualities to clients.	
(3) Self-control		
Resisting Temptation or Action	1. I can stay calm and rational when the client is giving me a hard time or has unreasonable demands.	Tangney et al. (2004)
	2. I can reject unethical behaviors when tempted by high service charges.	
Task Performance	1. I can manage time effectively and meet goals before deadlines.	
	2. I can handle sales pressure and methodically meet the sales targets specified by the company.	
Interpersonal Relationships	1. I can take note of and respond to the client's demands and opinions when interacting with him/her.	
	2. I can understand and respect their perspectives and cultural backgrounds when interacting with my colleagues or other people from different backgrounds.	
Psychological Adjustment	1. I can motivate myself to move forward when coping with failure or frustration.	
	2. I can self-regulate and achieve an optimal state of mind when I encounter stress and anxiety.	
(4) Certainty Effect		
Certainty Effect	1. I tend to handle transactions with explicit sales prices, and the buyer genuinely has the funds and willingness to do business.	Chia (2019)
	2. I tend to recommend cases with explicitly lower returns and risks.	

(Continued…)

(Table 1 Continued)

Construct	Questionnaire Item	Source
(4) Certainty Effect		
Certainty Effect	3. Rather than wasting time researching and assessing a challenging and unfamiliar case with higher returns, I would rather continue handling cases I am accustomed to.	Chia (2019)
(5) Disposition Effect		
Selling Winners	1. When the economy is good, I will recommend that customers sell sellable products first.	Lin and Fu (2015)
	2. When a product has both strengths and weaknesses, I will recommend popular products to customers first.	
Holding Losers	1. When the economy is sluggish, I will try to reduce the service charge to increase the volume of transactions.	
	2. When a product has both strengths and weaknesses, I will consider delaying the sales of less popular products.	
(6) Ethical Intentions		
Ethical Intentions	1. I tend to adopt behaviors that meet ethical standards when choosing between short-term benefits and long-term objectives.	Lee and Yu (2007), Jones (1991)
	2. I do not give in to unethical intentions under the stress of meeting sales targets and peer competition.	
	3. I am aware of whether I am acting ethically.	

3.3 Sampling Design and Sample Collection

Multiple factors must be considered when determining the sample size because this affects the accuracy of the estimation results. Thus, an error tolerance of 0.05 and a significance level (α) of 0.05 are used in this study. To obtain a 95% confidence level[5], the required sample size is 363. This study uses 641 valid questionnaires, which is more than the required number. The questionnaire is administered in person to real estate agents who are working in direct sales and

[5] Sample size $= \frac{\frac{z^2 \times p(1-p)}{e^2}}{1+(\frac{z^2 \times p(1-p)}{e^2 N})}$

N: The number of in-service real estate agents registered in Kaohsiung City (as of August 2023).

e: Error.

z: z-score (the distance between a specific ratio and the mean, measured in units of standard deviation)

p: The expected questionnaire response rate.

franchise real estate branch offices in Kaohsiung City districts with a high population density and mobility flow. The 11 surveyed companies included Sinyi Realty, Yung-Ching Realty, Taiching Realty, HB Housing, U-Trust Rehouse, Yungyi Housing, and Great Home Realty. First, we listed the number of branches of each company in the five districts, and then distributed the questionnaire based on convenience of surveying. The branch offices are located in the Fongshan (n = 31), Cianjhen (n = 20), Sanmin (n = 36), Zuoying (n = 36), and Nanzi (n = 15) districts. Of the 1000 questionnaires administered between May 15 to June 10, 2023, 668 were returned. After removing 27 invalid responses, there are 641 valid questionnaires, which is a valid response rate of 64.1%.

4. Data Analysis of the Sample

The data are examined by using the AMOS module in the SPSS for Windows software (version 27.0). In order to examine the structural distribution of the sample, frequency distributions are used to describe the demographics of the sample, followed by reliability and validity analyses of the availability heuristic, regret aversion, self-control, and the certainty and disposition effects.

4.1 Descriptive Statistics of the Sample

In the valid sample, 51.8% of respondents are male and 48.2% are female. They range from 18–61 years old. Most of the respondents graduated from college or university (70.7%). Only 9% majored in real estate-related studies. Most of the respondents have an annual mean income that does not exceed NT$600,000 (16,496.75 USD), with 12.8% who earn between NT$510,000 and NT$600,000 (16,835.13 and 16,496.75 USD); 17.0% who earn between NT$410,000 to NT$500,000 (13,534.48 to16,505.46 USD) and 19.7% who earn less than NT$400,000 (13,204.59 USD). Regarding marital status, 45.4% are married, and 55.6% are single. Most have been working in the real estate brokerage industry for 1–3 years (29.3%). Supervisors account for 14.4% of the respondents. Regarding the business model, 25.1% are in direct sales, and 74.9% are employed in franchises. In-service training programs on ethics are provided at 78.8% of the companies. Around 34.2% of the respondents have a real estate agent license, while the majority or 65.8% do not (Appendix A).

4.2 Reliability and Validity Analysis

4.2.1 Reliability Analysis

Reliability reflects the measurement quality (i.e., whether similar data values can be obtained through repeated observations of the same event). Different scholars have offered different acceptable Cronbach's α values. Kline (1998) notes that a Cronbach's α larger than 0.9, 0.8, 0.7, and 0.5 indicates excellent,

good, moderate, and acceptable reliability, respectively. In this study, the Cronbach's α of all of the constructs is larger than 0.5, except for regret aversion (0.223) and the certainty effect (0.444). Therefore, the reliability of the constructs is within an acceptable range, which points to the robustness and consistency of the questionnaire (Table 2).

Table 2 Reliability Analysis of the Constructs

Construct	Number of items	Cronbach's α
Availability heuristic	3	0.525
Regret aversion	2	0.223
Self-control	8	0.787
Certainty effect	2	0.444
Disposition effect	4	0.500
Ethical intentions	3	0.842

4.2.2 Validity Analysis

The validity analysis consists of analyzing the content, convergent, and discriminant validities. Regarding content validity, relevant studies on ethical intentions, and selected themes that align with ethical intentions are used, and the contents, meanings, grammar, and terminology are revised; therefore, the questionnaire has good content validity.

Regarding convergent validity, the standardized factor loadings of all of the constructs are greater than 0.5 and achieve the significance level. Based on the regression analysis, Certainty 1 (see first item of Certainty in Table 1) is removed because its loading is 0.111. Except for previous experiences, Regret 1 (see first item of Regret Aversion in Table 1), resisting temptation or action, Certainty 2 (see second item of Certainty in Table 1), and selling winners, all of the standardized factor loadings are greater than 0.5, which shows that the questionnaire has good convergent validity (Table 3).

The composite reliability (CR) of each latent variable is composed of the reliabilities of all the measured variables. A higher CR means that the indicators of the constructs of the latent variable have greater internal consistency. Fornell and Larcker (1981) suggest that an ideal CR should be greater than 0.6. Except for regret aversion, all of the constructs in this study has a CR greater than the recommended value of 0.6.

The average variance extracted (AVE) of a latent variable is the amount of variance that can explain for all of the measured variables. Therefore, a higher AVE of a latent variable means that it has better ability to explain the variances of all the measured variables, greater reliability and higher convergent validity. Fornell and Larcker (1981) suggest that an ideal AVE should be greater than 0.5. Except for regret aversion, all of the constructs have an AVE greater than 0.5.

Regarding discriminant validity, Fornell and Larcker (1981) also suggested that the square root of the AVE of a construct should be larger than the correlation coefficient between that construct and the other constructs. Except for regret aversion, all of the constructs meet this criterion. Therefore, the questionnaire has good discriminant validity (Table 4).

Table 3 Analysis of Questionnaire Reliability, Factor Loadings, and AVE

Variable	Factor loading (λ) (Unstandardized)	Factor loading (λ) (standardized)	Error variance	Reliability of measured variable	CR	AVE	R^2 assessed through structural equation
Availability heuristic					0.723	0.668	—
Previous experiences	0.094***	0.149***	0.506	0.022			
Ease of recall	1.000	1.000	0.001	0.999			
Regret aversion					0.158	0.099	—
Regret 1	2.276***	0.491***	1.095	0.241			
Regret 2	1.000	0.207	1.498	0.043			
Self-control					0.870	0.636	—
Resisting temptation or action	0.668***	0.473***	0.424	0.223			
Task performance	0.774***	0.605***	0.284	0.366			
Interpersonal relationships	0.672***	0.653***	0.166	0.426			
Psychological adjustment	1.000	0.842	0.112	0.709			
Certainty effect					0.639	0.534	—
Certainty 2	0.262***	0.295***	0.946	0.087			
Certainty 3	1.000	1.000	0.001	0.999			
Disposition effect					0.838	0.793	0.123
Selling winners	0.121***	0.192***	0.439	0.037			
Holding losers	1.000	1.064	−0.133	1.132			
Ethical intentions					0.913	0.778	0.044

(Continued…)

(Table 3 Continued)

Variable	Factor loading (λ) (Unstandardized)	Factor loading (λ) (standardized)	Error variance	Reliability of measured variable	CR	AVE	R^2 assessed through structural equation
Ethical 1	1.000	0.762	0.199	0.581			
Ethical 2	1.130***	0.779***	0.228	0.607			
Ethical 3	1.071***	0.852***	0.119	0.726			

Notes: *** denotes p < 0.01. Ethical 1, 2, and 3 denote the first, second and third items of Ethical Intentions in Table 1.

Table 4 Correlation Matrix of the Latent Variables.

	Certainty effect	Self-control	Regret aversion	Availability heuristic	Disposition effect	Availability heuristic
Certainty effect	0.731					
Self-control	−0.167	0.798				
Regret aversion	0.491	−0.253	0.314			
Availability heuristic	0.120	−0.169	0.474	0.818		
Disposition effect	0.312	−0.158	0.274	−0.108	0.890	
Ethical intentions	−0.068	0.038	−0.074	−0.061	−0.206	0.882

Note: The diagonals represent the square root of the AVE of a construct.

5. Empirical Results and Analysis

5.1 Overall Model Fit

This study uses the maximum likelihood approach for parameter estimation and the overall model fit to evaluate the fit of the model framework. Hair et al. (1998) devise three fit measures (absolute fit, incremental fit, and parsimonious fit), which are described as follows:

(1) Absolute fit measures are used to determine the ability of the overall model to predict the covariance or correlation matrix. According to Table 5, the chi-squared (χ^2) value is 380.746 (p = 0.001), thus indicating that the hypothetical and observed models differ significantly. However, the χ^2 test is very sensitive to the number of observed values. A higher number means that it is

more likely the χ^2 value is high and, thus, more likely that the null hypothesis is rejected. In contrast, a smaller number means that it is less likely the χ^2 value attains statistical significance, thus the null hypothesis may not be rejected, and a statistically significant conclusion may not be obtained. Therefore, to ensure the reliability of the study results, the researcher must consider other fit measures besides the χ^2 test (Chiou, 2006). The $\chi^2/degrees\ of\ freedom\ (df)$ ratio in this study is 5.439. Marsh and Hocevar (1985) suggest that an acceptable χ^2/df should be smaller than 5. However, because this study has a sample of 641, the χ^2/df is rather large and not within the acceptable range. Hair et al. (1998) note that the fit is acceptable when the goodness of fit index (GFI), comparative fit index (CFI), and normed fit index (NFI) are all larger than 0.90, and the root mean square residual (RMR) is smaller than 0.05. Yu (2006) notes that a root mean square error of approximation (RMSEA) smaller than 0.05 indicates a good fit, and an RMSEA smaller than 0.08 indicates an acceptable fit. The χ^2/df, GFI, RMR, and RMSEA in this study are all within an acceptable range.

Table 5 Model Fit Measures

Statistical Test Measure		Ideal Fit Standard	Our Result
Absolute Fit measure	χ^2 (*p*-value)		380.746 (p = 0.001)
	χ^2/df	<5	5.439
	GFI	>0.90	0.928
	RMR	Smaller is better	0.065
	RMSEA	Smaller is better; preferably <0.05	0.083
Incremental Fit Measure	*AGFI*	>0.90	0.876
	NFI	>0.90	0.838
	CFI	>0.90	0.861
Parsimonious Fit Measure	*PNFI*	>0.50	0.558
	PGFI	>0.50	0.541

(2) Incremental fit measures are used to compare the null and theoretical models developed in a study. The AGFI, NFI, and CFI are 0.876, 0.838, and 0.861, respectively. Despite falling below the required value of 0.9, nevertheless, the values are very close to 0.9. These indicators are not formal statistical tests despite having standard values. The obtained values merely reflect the strength of the indicators. The incremental fit measures of the theoretical model in this study are all within an acceptable range.

(3) Parsimonious fit measures, also known as adjusted fit measures, assess the degree of fit of each estimated parameter. Parsimonious fit measures of the overall theoretical model in this study are within an acceptable range. To summarize, the indicators suggest that the theoretical model in this study has a good overall fit.

5.2 SEM Empirical Results and Discussion

The empirical results of the unstandardized coefficients estimated through SEM are shown in Table 6 and Figure 2, and described as follows. The estimated coefficient of the influence of the availability heuristic on ethical intentions is −0.018 and does not achieve significance. Therefore, H1 is not supported. Liu (2016) shows that an individual tends to be risk-seeking when dealing with a potential loss but is more risk-averse when dealing with a potential gain. The availability heuristic can be used to determine the probability of an event. An event that is more recent can better serve as a reference for decision-making. After evoking imagination, the availability heuristic can cause bias, such as skewing, in ethical judgments in real-life settings (Slovic et al., 2004). However, since the empirical results do not support the influence of the availability heuristic on ethical intentions, Cho (2019) notes that in addition to practice and experience, real estate valuers need to have theoretical knowledge, competence in price estimation analysis, and proficiency in using software for valuation in order to make scientific judgments and rational analyses. These reduce the price biases and unethical intentions caused by the availability heuristic, and increase the credibility of real estate prices.

The estimated coefficient of the influence of regret aversion on the disposition effect is 0.579 and significant at the 10% level. A higher level of perceived regret aversion means a higher disposition effect. Shefrin and Statman (1985) describe regret aversion as an emotional feeling associated with the ex-post knowledge that better gains may have been obtained if a different decision was made in the past. Seiler et al. (2020) also have similar findings in their real estate study. Regardless of the trading band that real estate prices fall into, real estate agents must provide clients with rational disposition effects. In practice, real estate agents tend to sell winners and ride losers when they are influenced by regret aversion. As a result of this disposition effect, clients passively receive information when the information is asymmetrical. The empirical results support H2.

The estimated coefficient of the influence of self-control on the disposition effect is −0.171 and significant at the 5% level. More self-control means a weaker disposition effect. Schlafmann (2021) reports in a housing and mortgage study that the disposition effect is less likely to be present in people with more self-control. Similarly, Niloofar (2012) states that a higher degree of self-control reduces the size of the disposition effect. In practice, real estate sales prices can reach hundreds of millions of dollars. Under the influence of obtaining high service charges, real estate agents may perform actions in their own interests or be unable to regulate the influence of their emotions on their impulsiveness. If real estate agents lack self-control and cannot think rationally, they may provide customers with false and irrational investment suggestions, thus increasing the influence of the disposition effect and thereby reducing ethical intentions and compromising the rights of consumers. The empirical results support H3.

The estimated coefficient of the influence of the certainty effect on the disposition effect is 0.213 and significant at the 1% level. A stronger certainty effect means a higher disposition effect. The empirical results support the findings of Chia (2019), in which land prices are higher when there is much uncertainty about redevelopment. The disposition effect that benefits sellers becomes more pronounced when their uncertainty is evident. Chia (2019) outlines the influence of the certainty effect on the disposition effect in the real estate industry, in which opportunists only consider the possibility of making profits and overlook the overall sales results. In practice, when earning a profit, real estate agents tend to choose options with a higher level of certainty (i.e., options with a greater possibility of earning money). Therefore, real estate agents may preferentially sell popular products in the sales process. While this decision is irrational, real estate agents may overlook the existing market conditions, individual customer demands or case characteristics, or other underlying profitable opportunities for the sake of over-pursuing myopic benefits. The empirical results support H4.

The estimated coefficient of the influence of the disposition effect on ethical intentions is −0.099 and significant at the 1% level. A higher disposition effect means less ethical intentions. The empirical results support Lin and Fu (2015) and Schwepker and Good (2017). The buying/selling behaviors of investors are reflected in the trading volume when the market return varies. The disposition effect emerges and affects their ethical intentions. In practice, this study applies the disposition effect in the real estate industry, where the real estate agents would preferentially sell higher-priced or more popular products and hold on to lower-priced or less popular products. In reality, real estate agents may overlook market conditions or even conceal important information to sell popular products. Consequently, despite the short transaction time, the rights and interests of both the buyer and seller are negatively impacted. Thus, the empirical results support H5.

Figure 2 SEM of the Theoretical Model (Unstandardized Coefficients)

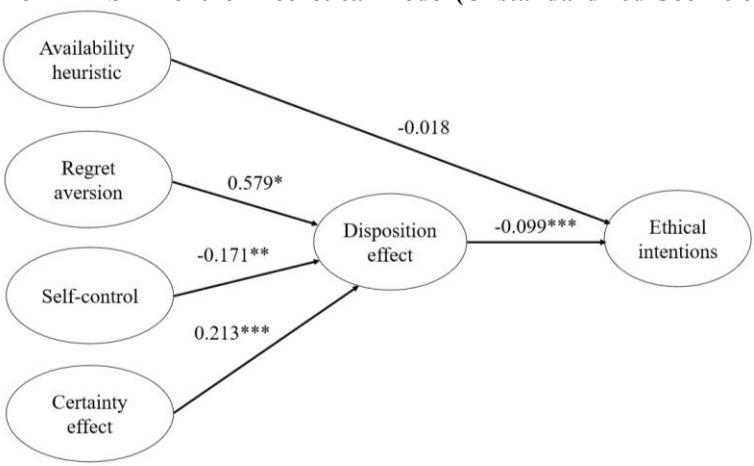


Table 6 Estimated Structural Coefficients in Hypothetical Theoretical Model

Hypothesis	Relationship between Variables	Path Coefficient (unstandardized)	Path Coefficient (standardized)	Standard Error	CR	*p*-value	Outcome
H1	Availability heuristic → Ethical intentions	−0.018	−0.039	0.019	−0.921	0.357	Not supported
H2	Regret aversion → Disposition effect	0.579*	0.141	0.329	1.763	0.078*	Supported
H3	Self-control → Disposition effect	−0.171**	−0.084	0.086	−1.974	0.048**	Supported
H4	Certainty effect → Disposition effect	0.213***	0.229	0.046	4.598	0.001***	Supported
H5	Disposition effect → Ethical intentions	−0.099***	−0.202	0.020	−4.953	0.001***	Supported

Note: * denotes $p < 0.1$; ** denotes $p < 0.05$; *** denotes $p < 0.01$.

6. Conclusions and Recommendations

6.1 Theoretical Implications

This study applies SEM to examine the structural and causal relationships among the availability heuristic, regret aversion, self-control, certainty and disposition effects, and ethical intentions in real estate agents. First, we explore the influence of the availability heuristic on ethical intentions. Then, we explore the influences of regret aversion, self-control, and the certainty effect on the disposition effect, as well as the influence of the disposition effect on ethical intentions. Previous studies have seldom used a behavioral economics approach to examine the ethics of real estate agent. Most studies on the disposition effect have focused on stock investment, and very few on the real estate industry. The contributions and value of this study are on its application of a behavioral economics approach to examine real estate ethical issues. The fit test of the linear structural model reveals that the fit of the overall theoretical model is acceptable and, therefore, the conceptual framework model is supported.

The empirical results show that regret aversion, self-control, and the certainty effect significantly influence the disposition effect, which significantly and negatively influence the ethical intentions of real estate agents. The empirical results show that the disposition effect is indispensable in the ethical intentions of real estate agents.

6.2 Practical Implications

This study centers on the ethical intentions of real estate agents and examine how ethical intentions are influenced by the availability heuristic, regret aversion, self-control, and the certainty and disposition effects. The results show that ethical intentions are an interesting topic in real estate research.

In practice, real estate agents tend to sell winners and ride losers when they are influenced by regret aversion. The disposition effect becomes more prominent when they are tempted by high commissions, as they tend to prioritize their personal interests or have poor self-control. This consequentially damages the rights of their clients. Real estate agents tend to choose options which a higher certainty when doing business, and may pursue short-term interests rather than other potentially beneficial opportunities and overlook market conditions. To complete a sales deal, real estate agents may conceal important information and persuade the buyer to reach an agreement quickly. This unethical behavior damages both the interests of the buyer and seller and affects the sustainability of the industry. Therefore, it is important to improve the ethical intentions of real estate agents by providing internal and external employee training programs so that they can strengthen their occupational ethics. Fostering an ethical climate and developing ethical norms in the company are crucial for the

industry's sustainability and serve as reference for government policymaking for the industry.

6.3 Recommendations for Future Research

Even though several of the questionnaire items failed to effectively and comprehensively encapsulate the intended concepts, we did check the basic reliability and validity of the existing questionnaire and determined that the measurement indicators are reliable to a certain extent within the current scope. The Cronbach's α of regret aversion is 0.223, which is low. Previous experiences, Certainty 2, and Selling winners have low factor loadings (0.149, 0.295, 0.192, respectively). The CR of regret aversion is less than the recommended value of 0.6, and this affects the convergent validity. This may be attributed to the understanding of the of behavioral variables and the item description, which we will work on in future studies. Due to limited time and resources, we are currently unable to redo the survey in an expanded study area. However, the sample in this study is still representative as it reflects the behavioral models of real estate agents to a certain extent. We are aware that it is important to validate the study results through a larger study area. We plan to include more areas in future studies so as to increase the applicability of the findings in different scenarios and populations. This study adopts a behavioral economics approach to explore the ethical intentions of real estate agents. Including other behavioral economic concepts, such as mental accounting, the framing effect, and overconfidence could better explain the influence and interactions of different behavioral economic variables on ethical intentions of real estate agents. Indeed, future directions for research include the influence of store business model (franchise/direct-sales) on ethical intentions of real estate agents, as well as the availability of ethical training on their ethical intentions. Lastly, we are aware that cultural differences may influence the ethical intentions of real estate agents. However, this study aims to explore several common psychological mechanisms like self-control and regret aversion, which are generalizable in different cultures. Even though cross-cultural comparisons are not performed in the current study, we believe that our findings greatly contribute to the understanding of ethical intentions of real estate agents. The influences of cultural factors can be taken into account in future studies to facilitate cross-cultural comparisons and analyses.

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Appendix A

Table A1 Descriptive Statistics of the Sample

Variable		Frequency	Effective percentage
Biological sex	Male	309	51.8%
	Female	332	48.2%
Age	18–20 years old	1	0.2%
	21–25 years old	62	9.7%
	26–30 years old	126	19.7%
	31–35 years old	96	15.0%
	36–40 years old	74	11.5%
	41–45 years old	79	12.3%
	46–50 years old	61	9.5%
	51–55 years old	67	10.5%
	56–60 years old	53	8.3%
	≥61 years old	22	3.4%
Education level	Junior high or elementary school and less	6	0.9%
	High school	152	23.7%
	College/university	453	70.7%
	Graduate studies	30	4.7%
Majored in real estate studies	Yes	58	9.0%
	No	583	91.0%
Mean annual income	NT$400,000 and below	126	19.7%
	NT$410,000 to NT$500,000	109	17.0%
	NT$510,000 to NT$600,000	82	12.8%
	NT$610,000 to NT$700,000	50	7.8%
	NT$710,000 to NT$800,000	48	7.5%
	NT$810,000 to NT$900,000	41	6.4%
	NT$910,000 to NT$1,000000	44	6.9%
	NT$1,010,000 to NT$1,100,000	35	5.5%
	NT$1,110,000 to NT$1,200,000	16	2.5%
	NT$1,210,000 to NT$1,300,000	14	2.2%
	NT$1,310,000 to NT$1,400,000	8	1.2%
	NT$1,410,000 to NT$1,500,000	7	1.1%
	NT$1,510,000 and above	61	9.5%
Marital status	Married	291	45.4%
	Single	350	54.6%

(Continued…)

(Table A1 Continued)

Variable		Frequency	Effective percentage
Length of service in the real estate brokerage industry	<1 year	117	18.3%
	1–3 years	188	29.3%
	4–6 years	99	15.4%
	7–9 years	90	14.0%
	11–15 years	81	12.6%
	16–20 years	40	6.2%
	≥21 years	26	4.1%
Currently holding a supervisory role	Yes	92	14.4%
	No	549	85.6%
Company's current business model	Direct sales	161	25.1%
	Franchise	480	74.9%
Company currently provides in-service ethical education training programs	Yes	505	78.8%
	No	136	21.2%
Holds a real estate agent license	Yes	219	34.2%
	No	422	65.8%

Note: NT$1 = 0.033 USD