# Impulsive Shopping Decisions

## -can they be predicted?


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D-level Thesis / Magisteruppsats

Department of Economics

February 2007

## Abstract

This thesis aims to predict a model for determining impulsivity in shopping behaviour by testing the variables cognitive ability, tendency to be influenced by framing, mood, age, gender, education, income and ethnicity. The variables are assumed to be of importance for determining impulsivity in shopping behaviour on basis of previous theories and research. An important part of the thesis is to find out whether or not cognitive ability and framing/contextualization influence the individual's tendency to be impulsive when shopping. The existence of such a relationship would imply that such variables are always present in the economic decision making process and therefore could give rise to a substantial bias.

102 individuals are asked to complete a survey in which the first part contains preformulated questions aiming to test the individual's tendency to be influenced by framing and cognitive ability, and the second part contains questions on personal shopping behaviour. An impulsivity index is calculated for each participant on basis of the answers from the survey. This index is tested for correlation with the independent variables, and a regression model for determining impulsivity is sought. Correlation results show that 'Gender' is the only variable which has a significant correlation with 'Impulse Index'. The regression model shows that 'Gender' and the ethnicity 'Indian' are the only significant variables which are predictors for determining impulsivity in shopping behaviour, using a two-tailed ten percent significant level. The explanatory value for the obtained multiple regression model is only 0.09, implying that the model is not a good predictor for determining impulsivity in shopping behaviour. Reasons for this could be that the some of the included variables may be affected by bias, and some may be difficult to measure and interpret. Another reason could be that the reasoning behind the decisions to include the variables is not valid or of enough relevance for the study.

# 1. Introduction

*In this chapter, theories behind buying behaviour and consumer theory are examined, leading us to distinguish general purchases from irrational, impulsive purchases. The chapter finishes by a problem description and a thesis statement.*

## *1.1 General Buying Behaviour*

In economics, understanding consumer buying behaviour is important for a variety of reasons. By gaining insight to how consumers recognize needs and how they go through the purchasing process, producers can "push the right buttons", stimulate needs and provide information in the right stages of the purchasing process. When producers understand what consumers need and how to satisfy consumer needs, the economy works more effectively since there are no gaps in production and no producing the "wrong" items.

While purchasing new products, consumers' behaviour is said to follow a series of steps shown below.[1]

**Need recognition → Information search → Evaluation of options → Decision → Post purchase behaviour**

In this process, the consumer is influenced by *income*; the consumer can buy any combination of bundles inside the budget line, *price*; the different combinations of bundles that gives the consumer maximum utility according to 'more is better' are found on the budget line, and *personal preferences*; it is assumed that the consumer can order his or her preferences in order to maximize personal utility. In turn, producers are assumed to know about a consumer's preferences by observing the consumer's purchase. This is called the assumption of *revealed preferences*,[2] and it is becoming even more of a reality in today's society since larger stores are filing consumer purchases on computer in order to narrowly target their advertising and campaigns.

[1] See for example Armstrong and Kotler, 2000, p.156 and Piana, 2004.
[2] See for example Hey, 2003, p.232-235.

For consumers, there are different types of buying behaviour depending on what kind of item the consumer is looking to buy. *Habitual buying* is said to occur when consumers buy items repeatedly without too much consideration of attributes, brand or style. [3] *Dissonance reducing buying behaviour* occurs when consumers buy more expensive items and the information seeking process is more extensive than when buying cheaper items.[4] *Variety seeking* is said to occur when the consumer is seeking to try another brand or a differentiated product in order to experience change.[5] Understanding which of these buying behaviour processes a consumer goes through goes hand in hand with understanding the buying behaviour process illustrated above. If an item is bought mainly by habit and repetition of behaviour, new products face difficulties entering the market despite perhaps being technologically superior,[6] resulting in losses for the economy. Variety seeking creates an opportunity for new products to enter the market and prove superior, so producers need to be aware of this type of consumer behaviour in order to capture the benefits. Impulse buys can be seen as a more extreme kind of variety seeking buying behaviour; however, impulsive shopping decisions present problems in the sense that they are extremely difficult to predict and account for. If all purchase decisions would be made on impulse, it would be difficult if not impossible to plan output and production since they would depend to a high degree on selling strategies and product placement.

## *1.2 Impulse Buying and Rational Choice*

Buying on impulse differs from "regular" buying behaviour in the sense that the individual does not follow the normal purchase behaviour steps. Impulse buys are generally not based solely on need, but rather on identity and symbols associated with the item.[7] The information seeking stage and evaluation of options are quickly bypassed or excluded when an agent buys on impulse. Since impulse buys are not consciously planned, but arises immediately upon confrontation with a certain

[3] Jager and Janssen, 1999.
[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] University of Kent UK, 1999, Economic and Social Research Council Research Programme : Economic Beliefs and Behaviour

stimulus,[8] they are likely to be associated with a high degree of post purchase regret.[9] The assumption of revealed preferences does not hold when it comes to impulsive decisions, since customers only display a one-time preference when purchasing the product. This can confuse producers, who are" misled" to think that the impulsive purchase is in line with the customer's consistent preferences.

General purchase behaviour is in economics associated with the consequential and logical reasoning underlying rational choice. Rational choice rests upon many assumptions, where the most important foundations with implications for this thesis are time consistency; if the agent prefers A>B today, he or she will prefer A>B tomorrow or in ten years time, and the absence of external influences and cognitive perception in the decision making process. As mentioned above, impulsive decisions are not consistent with how the rational agents are expected to behave. The very nature of an impulse decision – a quick response, resulting from an emotion or a sudden influence – implies that the purchase is not made in accordance with time consistent preferences, nor is it free from external or cognitive influences. If we make the assumption that impulsive decisions diverge from the rational choice model, individuals who repeatedly shop on impulse would be assumed to be less rational. There are various theories which attempt to explain *why* people shop on impulse, but so far no explanation to why certain persons are more likely to shop on impulse.[10]

## *1.3 Thesis Statement*

This thesis will attempt to predict a model for determining which factors increase the likelihood to shop for individuals to shop on impulse. It will check whether contextualization (examined by checking for consistency in the Asian disease problem) and cognitive ability (examined by using pre formulated questions designed to test cognitive ability) are predictors for determining impulsivity in shopping behaviour. The variables mood, age, gender, education, income and ethnicity will be tested in order to see if these factors are predictors for determining impulsivity in personal shopping behaviour.

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[8] Rook, 1987, p. 189.
[9] University of Kent UK, 1999, Economic and Social Research Council Research Programme : Economic Beliefs and Behaviour.
[10] University of Kent UK, 1999, Economic and Social Research Council Research Programme : Economic Beliefs and Behaviour.

## *1.4 Purpose*

The main focus in the thesis will be to calculate a model for determining impulsivity in shopping behaviour, on basis of the independent variables Asian disease, CRT, mood, age, gender, education, income and ethnicity. Data is collected from a survey, in which 102 individuals participated. Among the independent variables, most focus will be put on determining whether there is a connection between cognitive ability, tendency to be affected by framing, and impulsive shopping behaviour. Towards the end of the study, an external influence index will be calculated as well in order to compare general impulsivity in shopping behaviour with impulsivity due to external pressure.

A purpose which would serve a larger context is the fact that economics as a science tend to focus on the results arising from imperfect data, not on the perception of data.[11] To add to this, perfect market rationalists argue that mistakes agents make in pursuing rational decisions are not a problem in explaining aggregate behaviour, as long as they tend to cancel each other out.[12] However, many of the departures from the rational choice model have been described as systematic errors.[13] If it can be determined that impulsive shopping decisions are connected to the individual's cognitive ability, impulsive buying behaviour might not be random but rather systematic in nature, and this would imply that impulsivity in shopping behaviour needs to be addressed as a systematic error in the economic rational choice model, in order to be fully understood by both producers and consumers.

[11] Maital, 1988, p. 452
[12] Stanovich and West, 2000, p.647.
[13] Ibid.

# 2. Earlier Research and Predictions

*In this chapter, the included independent variables will be explained below and motivated on basis of previous research. In the event of there being no previous research to motivate the inclusion of the variable, the reasons for including the variable will be explained on basis of assumptions and economic theory.*

## *2.1 Impulse Index*

The purpose of this thesis is to examine which factors are predictors for determining impulsivity in shopping behaviour. In order to achieve this purpose, an index for impulsivity in shopping behaviour will be calculated for each participant on basis of answers from the survey questions 6-10a.

Naturally, there are issues associated with measuring shopping impulsivity in this way. Defining impulse buying in itself constitutes a problem, since there is a difference between letting people answer questions in a survey and observe their behaviour from an objective viewpoint. According to the literature, there are different types of impulse buying; there is *pure, reminder, suggestion* and *planned impulse buying*.[14] Since participants in the survey are left to define what constitutes impulsive shopping decisions to themselves, a disturbance regarding differences in impulsivity due to different interpretations of the subject, may exist.

On the other hand, a study which aims to map out impulsive shopping behaviour by following participants around while they are shopping, is just as likely to be biased compared to a study based on survey questions. When participants know their behaviour is being monitored, they are more likely to alter their behaviour following a desire to "look better". Survey questions are more anonymous and can therefore make for a higher degree of honesty on part of the participants. Furthermore, the survey questions used to examine personal shopping behaviour in this study were designed to be short and simple, in order to obtain accurate answers from the participants.

[14] Stern, 1962, p.59

## 2.2 Asian Disease Problem

The Asian disease problem is measured by assigning the value one to participants who give inconsistent answers, and the value zero to participants who give consistent answers.

The Asian disease problem, as formulated by Tversky and Kahneman (1981), is included in the survey in order to examine participants' consistent preferences. If a participant is inconsistent in this question, he or she can be said operate on impulse and give the most appealing answer according to framing and contextualization, without much analytical consideration. Therefore, an individual who is inconsistent in this problem would be assumed to be inconsistent in his or her preferences when it comes to personal shopping behaviour. Similarly, being consistent in the Asian disease problem represents an ability to decontextualize abstract situations, and this ability would be expected to translate into real economic situations, thus resulting in a smaller tendency to be influenced by external circumstances and a greater tendency to follow a set of time consistent time preferences.

Kahneman, and many other psychologists, claim that we operate on two different cognitive systems. 'System 1' is highly contextualized, personalized, holistic, automatic, largely unconscious, and relatively undemanding of computational capacity. [15] 'System 2' is more analytical and requires some degree of consideration and effort. The tendency to contextualize and narrate a problem originates from system 1,[16] and represents a cognitive tendency to search for meaning and personalization in problems. Most humans show a tendency towards operating on system 1[17] , so this response must be overridden by system 2 in order for this system to carry out its function of abstracting complex situations.[18] Individuals who are inconsistent in the Asian disease problem, show a high tendency to operate mainly on system 1 since they tend to respond to the framing of the problem without much analytical consideration of the options. Therefore, being inconsistent in the Asian disease problem is expected to increase the tendency to be impulsive in shopping behaviour.

[15] Kahneman, 2003, p.1451
[16] Ibid p.662
[17] Stanovich and West, 2000, p.667
[18] Ibid

## 2.3 Cognitive Reflection Test

Questions 3-5 in the survey are made up of Cognitive Reflection Test (CRT) as formulated by Frederick (2005).[19] These problems are designed to examine individuals' cognitive reflection and ability to reject the quick, automatic response. CRT scores are measured by assigning each question the value zero if the participant gives the correct answer and the value one if the participant gives an erroneous answer. In total, participants will be assigned CRT scores between zero and three, where a lower CRT score represents a higher cognitive ability. Participants who have a low score on the CRT tend to operate more using 'system 2'. This behaviour is assumed to be connected with shopping behaviour in the sense that high CRT scores (corresponding to a low cognitive ability) would be expected to predict a higher 'Impulse Index'. The reasoning behind this assumption will be explained below.

In conducting cognitive reflection tests and relating them to financial risk taking preferences, Frederick (2005) found a connection between cognitive ability (patience or impatience), behaviour under risk, and patience regarding financial rewards. Individuals who scored correctly on all questions in the cognitive reflection tests were more likely to engage in a risk-taking financial behaviour, and more likely to be patient in order to receive a greater financial rewards in the future as opposed to receiving a smaller financial reward immediately.[20] Frederick also found that women scored lower on the CRT. Women were found to be more risk-averse than men, and more often preferred the sure immediate gain as opposed to a greater reward in the future.

Considering Frederick's result, individuals who score lower on the CRT (i.e. have a higher cognitive ability) are expected to be patient individuals who rarely shop on impulse. Shopping on impulse can be regarded as the opposite behaviour to being patient, since it includes immediate rewards and satisfaction. Following Frederick's results, women would also be expected to score lower on the cognitive reflection test, and therefore be more impulsive in their shopping behaviour than men. The fact that Frederick found women to be more risk-averse and to prefer a sure immediate gain to a greater reward in the future would in this thesis correspond to a higher tendency in

[19] Frederick, 2005

[20] This may sound ambiguous, but a tendency in an individual to be risk-taking should not be seen as equal to the same individual's ability to wait for a financial reward. The fact that the individual is risk-seeking simply means that he or she regards the benefits from the gamble as being larger or much larger than the sure gain; it does not mean that the individual is impatient.

women to shop when overcome by an impulse, as opposed to waiting for a "better deal".

## 2.4 Mood

Mood is measured as a binary variable, where a consumer who circles 'Mood' as being an influence when buying unplanned products is assigned the value one. Mood is included as an independent variable since impulse buying is associated with responding to a sudden emotion, and whether or not the individual is in a mood corresponding to the emotional stimulation should have some impact on the outcome. Previous research states that "impulse buys are presumed to be sensitive to consumers' mood states, but not enough research has been done in order to prove the influence of mood".[21]

## 2.5 Age

The participants are divided into different age groups, where the value one corresponds to the youngest age group 15-20, two corresponds to the age group 20-30, three corresponds to the age group 30-40 and so forth.

Some differences in shopping behaviour could be expected in different age groups, since younger people normally do not have an extensive financial responsibility and can allow themselves to splurge on impulse shopping. Rationality in shopping behaviour, or ability to resist instant gratification, increase with age.[22] Therefore, 'Impulse Index' is expected to reflect this by being negatively correlated to age.

## 2.6 Gender

Gender is treated as a binary variable where a man is assigned the value zero and a woman is assigned the value one.

As mentioned above, Frederick found that women scored lower on the CRT questions, implying – if the assumption regarding CRT scores and impulsivity holds - that they are more impatient and shop more on impulse. Frederick also found women to be more risk averse than men, which according to the assumptions behind this thesis would correspond to a higher tendency to shop on impulse. A study at the

[21] Rook, 1987, p.194
[22] Rook, 1987, p.190

University of Kent, UK,[23] showed that impulse buys are not generally based on need and functionality, but rather on product identity and symbolic associations. This is not surprising considering the assumption that impulsive buys usually result from a sudden emotion, sparked by a certain product or message. Furthermore, the study revealed that women tend to buy products according to symbolic values, as opposed to men who are more likely to buy products on basis of need and functionality. Therefore, all else being equal, being a woman is expected to increase 'Impulse Index' in this study.

## 2.7 Education

Education is also treated as a binary variable. Participants with a secondary or below education are assigned the value zero, and participants with a tertiary or above education are assigned the value one. Some differences in cognitive ability between different levels of education would be expected, since a higher education level means a higher ability to process information and be critical towards the impulsive answer in the cognitive ability questions. The correlation between cognitive ability and 'Impulse Index' was proved by Falch and Sandgren,[24] who performed a study regarding the effect of education on cognitive ability, using tests which did not favour any particular education, and found that investment in terms of time spent in school had a major impact on cognitive ability.[25] If the assumption that a higher cognitive ability predicts a lower impulsivity in shopping behaviour is valid, a higher cognitive ability for participants with a higher education should in turn predict a lower impulsivity in shopping behaviour.

## 2.8 Income

The participants are divided into four different income brackets where one represents the lowest income and four the highest. Income is expected to influence 'Impulse Index' on basis of basic economic theory. When income increases, the budget line shifts outward and the consumer can afford a combination of bundles which include more goods, provided the price of the goods stays the same.[26] In basic microeconomics, it is assumed that income is spent on two goods in order to facilitate

[23] University of Kent UK, 1999, Economic and Social Research Council Research Programme : Economic Beliefs and Behaviour
[24] Falch and Sandgren, 2006.
[25] Ibid. p.4
[26] See for example Perloff, 2004, p.110-111.

illustration of the problem, and the consumption of these goods simply increases when the budget line shifts outward. In reality, a larger income should mean that the consumer is able to afford bundles of goods which include one or more luxury goods. Impulse buys can be seen as a form of luxury goods since they are not necessary; if so, they would have been on the shopping list from the beginning. Hence, 'Impulse Index' is assumed to increase as income increases.

## *2.9 Ethnicity*

The participants were divided into four different ethnic groups; European/NZ European, East Asian, Indian and Pacific Islander. All these variables are treated as binary variables meaning that the variable 'European/NZ European' assumes the value one if the participant is European/NZ European, while the other variables corresponding to ethnicity assume the value zero. The decision to include ethnicity as a variable was taken since recent studies show that economic rationality varies for different ethnicities.

Levinson and Peng conducted a study between Chinese and North American citizens, and examined differences in cognitive bias and rationality while letting the participants in the study assign value to various objects.[27] Ownership, finding and loosing of the objects were framed in different ways. The study found significant differences between the two cultures regarding rationality, as the Chinese participants tended to be more sensitive to contextual information in determining the value of an object. Attempts to explain this behaviour included referrals to the fact that the culture in China is mainly holistic and self concept tend to be interdependent. In such a culture, the value of objects will be more likely to be viewed as part of group relation and context. America and other Western cultures tend to be more individualistic where the value of one's possessions is an important measure of one's own self-worth, and the value of objects are assessed with less consideration of external circumstances.

Another study regarding cultural differences in risk taking behaviour, also between citizens from China and North America, was conducted by Hsee and Weber.[28] This study found that the Chinese participants tended to be more risk seeking than the Americans. Similarly, the explanation given was that Chinese live in

[27] Levinson and Peng, 2006.
[28] Hsee and Weber, 1999.

a more holistic culture where individuals who take financial risk are able to rely on friends and family should worse come to worse and money would be needed. The authors call this phenomenon the "cushion hypothesis".

Applying Levinson and Peng's findings, Asians in this study[29] would be expected to differ in shopping behaviour compared to other ethnicities. Specifically, they are expected to be more affected by framing effects and hence be inconsistent in the Asian Disease question which in turn increases 'Impulse Index'. Since Asian culture is collectivistic, Asians would also be expected to buy presents and gifts for friends and family to a greater extent than participants from a more individualistic culture, resulting in a higher impulsivity index. Furthermore, Asians would also be expected to be more influenced by surroundings and environment, i.e. score a higher index regarding the influence index (question 10b-d) since Levinson and Peng's study show that they tend to be influenced by context.

Applying Hsee and Weber's findings - the fact that Chinese tend to be more risk seeking than Americans – an application which would apply to this thesis would be that Asians in this study could be expected to display a higher pattern of impulsivity in their shopping behaviour than participants from individualistic cultures, since they can count on family and friends backing them up should they spend too much money.

## *2.10 External Influence Index*

An 'External Influence Index' is created in order to examine whether or not there are any differences between general impulsivity in shopping behaviour and impulsivity due to external influences. Each circle in question 10b-d represents one point, and an 'External Influence Index' for each participant is created by adding together the scores from question 10b-d. All the independent variables used for testing 'Impulse Index' will be tested in order to determine which variables are significant for predicting the tendency to be influenced by external circumstances. The independent variables are assumed to have some impact on 'External Influence Index' on basis of the same assumptions made above. Measuring the tendency to shop on impulse due to external pressure is merely a narrower framing of the main thesis statement which is

[29] 'Asians' are in this study represented by East Asians and Indians. Both of these groups are assumed to originate from a collectivistic culture, where relationships and kinship are more important than individual value; or, to a certain extent, define individual value. Pacific Islander culture would also fall under this category, but since only four of the participants admitted to be of Pacific Island descent results originating from this group will not be representative enough to account for.

to determine factors of importance for measuring impulsive shopping behaviour. Therefore, the same reasoning as above is used in order to predict whether or not the independent variables have a positive or negative on ‘External Influence Index’.

# 3. Method and Material

*In this chapter the method and material used to answer the thesis statement will be presented and explained.*

In order to answer the thesis statement, primary data is collected from a survey, in which the first part contains pre made up questions: the Asian disease problem as formulated by Tversky and Kahneman (1981), and Cognitive Reflection Test (CRT) questions as formulated by Frederick (2005). The second part contains questions on personal shopping behaviour.[30] A random sample of 102 participants participated in the survey, and their answers are evaluated according to rationality. After assigning specific values depending on the answers to the questions regarding personal shopping behaviour, an 'Impulse Index' is created for each participant, corresponding to the participant's tendency to shop on impulse. 'Impulse Index' is calculated on basis of the participant's answers to questions 6-10a regarding personal shopping behaviour. For questions 6-9, the least impulsive answer to each question is valued to zero and the highest impulsive answer is valued to two. If the individual circles 'mood' in question 10a, he or she receives the value one in addition to the total scores from question 6-9. In this way, a total 'Impulse Index' is calculated for each participant.

Correlation tests are made in order to find out whether or not irrationality in shopping behaviour, i.e. impulsiveness, is connected to a tendency to be influenced by framing effects and low cognitive ability. Correlation tests are also made between the obtained impulse index and the variables mood, age, gender, education, income and ethnicity. A multiple linear regression equation with impulsivity in shopping behaviour as the dependent variable will then be calculated in order to determine a model to predict shopping impulsivity.

[30] The survey can be viewed in Appendix 1.

# 4. Results

*In this chapter, correlation tests and multiple regression results for 'Impulse Index' obtained from the survey data will be presented.* [31] *Regression results will also be presented for 'External Influence Index'. Further information about the sample from which the primary data was obtained can be viewed in Appendix 2.*

## *4.1 Impulse Index*

In order to find out which variables predict patterns in impulsive shopping behaviour, an 'Impulse Index' is created for each of the participants in the survey using the scores from questions 6-10a. 'Impulse Index' will be treated as a dependent variable, and the checked independent variables will be the Asian disease problem, CRT score, mood, age, gender, education, income and ethnicity. A ten percent two-tailed[32] significance level is used in all statistical calculations.

### 4.1.1 Correlation

When checking for correlation between 'Impulse Index' and the independent variables, the following results are obtained.

***Table 4.1***

**Dependent variable 'Impulse Index'**

| **Variable** | **Correlation with 'Impulse Index'** | **p-value** (two tailed) |
|---|---|---|
| Asian Disease | 0.03 | 0.76 |
| CRT | 0.03 | 0.77 |
| Mood | 0.15 | 0.13 |
| Age | -0.03 | 0.78 |
| Gender | 0.18* | 0.07 |
| Education | -0.03 | 0.76 |
| Income | -0.08 | 0.43 |
| White | 0.07 | 0.53 |
| East Asian | -0.15 | 0.13 |
| Indian | 0.15 | 0.15 |
| Pacific Islander | -0.10 | 0.35 |

*significant at the ten percent level

[31] For the statistical analyses, Norusis' *Guide to Data Analysis* and *Statistical Procedures Companion* are used as reference literature.

[32] Although the assumptions based on previous research state whether or not a positive or negative relationship between the independent and dependent variables is expected, we cannot assume for certain the direction of the relationship; hence we use a two-tailed instead of a one-tailed significance level.

In other words, 'Gender' is the only variable which shows a statistically significant correlation with the dependent variable. Since 'Gender' is a binary variable, assuming the value one if the participant is a woman, being an impulsive shopper – having a higher 'Impulse Index' - is correlated to being a woman.

### 4.1.2 Multiple Regression

In order to predict a model for determining impulsivity in shopping decisions, a multiple regression is calculated using 'Impulse Index' as a dependent variable. Theoretically, all the independent variables are assumed to be of some impact for determining 'Impulse Index'; however, in reality all independent variables may not turn out to be of significant importance.

'Impulse Index' is treated as a dependent variable, and all the independent variables Asian disease, CRT, mood, age, gender, education, income and ethnicity are tested in the model. The result from the regression is shown below:

***Table 4.2***

**Dependent variable 'Impulse Index'**

| **Variable** | **Coefficient** | **p-value** (two tailed) |
|---|---|---|
| C | 3.28*** | 0.00 |
| Asian Disease | 0.03 | 0.92 |
| CRT | -0.02 | 0.88 |
| Mood | 0.38 | 0.23 |
| Age | 0.23 | 0.89 |
| Gender | 0.69** | 0.03 |
| Education | -0.31 | 0.44 |
| Income | -0.11 | 0.66 |
| East Asian | -0.46 | 0.24 |
| Indian | 0.52 | 0.27 |
| Pacific Islander | -0.78 | 0.37 |
| $R^2$ | ***0.138*** | |

***significant at the one percent level **significant at the five percent level

The variable 'White' was excluded from the regression equation on basis of collinearity.[33] The explanatory value, $R^2$, for the above regression is only 0.138,

[33] Two variables are collinear if one vector is a linear combination of the others. When performing the regression, collinearity is tested automatically. If a variable affected by high collinearity is included in

implying that only 13.8 percent of the variations in 'Impulse Index' can be explained by the independent variables included in the multiple regression. We see that 'Gender' is the only variable which is statistically significant enough to be included in the regression equation, given a ten percent significance level. Since a man is assigned the value zero and a woman the value one, being a woman is expected to increase 'Impulse Index'. All other variables are of no significant importance for predicting variations in 'Impulse Index'.

### 4.1.3 Stepwise Multiple Regression

Considering the fact that the majority of the variables turned out to be insignificant in the multiple regression model, a stepwise multiple regression equation is now performed. In a stepwise variable selection, all variables are added one by one if they cause $R^2$ to increase by more than ten percent. If $R^2$ decreases by more than fifteen percent upon addition of a variable, the variable will be excluded. In the previous multiple regression model, the variable 'White' was excluded from the model on basis of collinearity. A stepwise multiple regression accounts for multicollinearity since it excludes variables which do not significantly increase the fit of the model.

After performing the stepwise multiple regression, the coefficients for the included variables in the best-fit-model is shown below:

***Table 4.3***

**Dependent variable 'Impulse Index'**

| **Variable** | **Coefficient** | **p-value** (two tailed) |
|---|---|---|
| C | 3.12 | 0.00 |
| Gender | 0.69** | 0.02 |
| Indian | 0.70* | 0.08 |
| ***$R^2$*** | ***0.09*** | |

**significant at the five percent level *significant at the ten percent level

The best model obtained from the stepwise multiple regression includes not only 'Gender' as a significant variable, but 'Indian' as well. Since 'Indian' is a binary variable - assuming the value one if the participant is of Indian descent - being Indian is expected to increase 'Impulse Index' if the other variable stays the same.

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the equation, estimation can be hindered because the explanatory variables' influence on the dependent variable is swamped by the model's random error (Belsey, Kuh and Welsch, 1980). SPSS accounts for this automatically by excluding variables which are highly affected by collinearity. Since collinearity is found, a specific collinearity test was performed which showed that the found collinearity is not a serious problem since it does not account for a large proportion of variance in two or more of the other variables.

$R^2$ for this regression is 0.09, indicating that a very small amount of the variations in impulsivity in shopping behaviour is explained by the variables 'Gender' and 'Indian'.

## *4.2 External Influence Index*

In order to distinguish the tendency to be influenced by external circumstances when shopping from the overall tendency to be an impulsive shopper, a new dependent variable called 'External Influence Index' is created by adding together each participant's score on question 10b-c. Multiple regression models are calculated in order to find predictors for the tendency to be influenced by external circumstances. The independent variables are the same as for 'Impulse Index', i.e. Asian disease, CRT, mood, age, gender, education, income, and ethnicity.

### 4.2.1 Multiple Regression

The variable coefficients for the multiple regression equation with 'External Influence Index' as a dependent variable are shown below:

***Table 4.4***

**Dependent variable 'External Influence Index'**

| **Variable** | **Coefficient** | **p-value** (two tailed) |
|---|---|---|
| C | 1.39*** | 0.00 |
| Asian Disease | 0.23 | 0.19 |
| CRT | -0.14* | 0.09 |
| Age | -0.06 | 0.50 |
| Gender | 0.51** | 0.04 |
| Education | -0.01 | 0.95 |
| Income | -0.02 | 0.87 |
| East Asian | -0.55** | 0.02 |
| Indian | -0.34 | 0.19 |
| Pacific Islander | -0.50 | 0.32 |
| ***$R^2$*** | ***0.22*** | |

***significant at the one percent level **significant at the five percent level *significant at the ten percent level

The results from the multiple regression show that a higher CRT score (i.e. a lower cognitive ability) makes for a slightly lower tendency to be affected by external influences; being female increases the tendency to be influenced by external circumstances; and being East Asian decreases the tendency to take outside pressure into account when shopping. $R^2$ for this model is 0.22, indicating that 22 percent of

the variations in the tendency to be influenced by external circumstances are explained by the independent variables.

### 4.2.2 Stepwise Multiple Regression

Since many of the included variables turned out to be insignificant in the model, we perform a stepwise multiple regression which only includes significant variables in order to find the best predictor model for determining 'External Influence Index'. Variables which increase $R^2$ by more than ten percent are considered significant and added in the model, and variables which decrease $R^2$ by more than fifteen percent are excluded from the model.

***Table 4.5***

**Dependent variable 'External Influence Index'**

| **Variable** | **Coefficient** | **p-value** (two tailed) |
|---|---|---|
| C | 0.67*** | 0.00 |
| CRT | -0.13* | 0.09 |
| Gender | 0.42*** | 0.01 |
| White | 0.40*** | 0.01 |
| ***$R^2$*** | ***0.17*** | |

***significant at the one percent level *significant at the ten percent level

The stepwise multiple regression reveals that a higher CRT score (i.e. a lower cognitive ability) makes for a lower external influence index; being female increases external influence index; and being white increases the tendency to be influenced by outside pressure. In other words, white females with a high cognitive ability tend to be most influences by external pressure. The explanatory value for this model is 0.17.

## *4.3 Independent Variables*

When testing the independent variables mood, age, gender, education level, income and ethnicity for correlation with the independent variables Asian Disease and CRT scores, no correlation similar to the one found by Fredrick between gender and cognitive ability is found. However, there is a negative correlation of -32.6 percent, between CRT score and education level in this sample significant at the one percent level. This implies that a lower CRT index, i.e. a higher cognitive ability, corresponds to a higher education level, which is consistent with Falch and Sandgren's findings.

# 5. Analysis and General Discussion

*In this chapter, the correlation and regression results for 'Impulse Index' will be discussed and analyzed. When results do not agree with expected results or existing theories, attempts will be made to explain why. Towards the end, the result for 'External Influence Index' is analyzed.*

## *5.1 Impulse Index*

The only variable which showed correlation with 'Impulse Index' was 'Gender'. When trying to predict a regression model for 'Impulse Index', the significant variables turned out to be 'Gender' and 'Indian'. In terms of finding a model for determining impulsivity in shopping behaviour this study has been unsuccessful. The obtained model from the stepwise regression has a much too low explanatory value (0.09) to be considered a good fit. Since $R^2$ is so small, a linear relationship between 'Impulse Index', 'Gender' and 'Indian' cannot be assumed. Below, the results from the survey will be discussed and the lack of importance of the majority of the included independent variables will be discussed.

### 5.1.1 Framing Effects and Cognitive Ability

Tendency to be influenced by framing and cognitive ability seem to have no significant impact on the tendency for individuals to diverge from the rational model of purchase behaviour and shop on impulse. The assumption that the Asian disease problem and the cognitive reflection tests are correlated with an impulsive shopping behaviour will have to be discarded. Therefore, it seems that an individual's cognitive ability and tendency to contextualize are unrelated to the ability to shop on impulse. However, there are a few implications regarding the test results which will be considered below.

Firstly, the Asian disease problem formulated by Tversky and Kahneman has given rise to much contention. For example, Berkeley and Humphrey[34] argue that programs A and C – which are considered to be a descriptively invariant response – might not be descriptively invariant in a participant's interpretation. They argue that the wording of the result; 'will be saved', combined with the outcome of option A (which is not described in the same exhaustive way as the consequences for option B),

[34] See Berkeley and Humphrey in Stanovich and West, 2000, p.656

might imply the possible intervention from a human agency in the future, thus saving more lives. The wording of program C does not suggest the possible existence of such a human agency in the future which might help to save more lives.[35] Under such construction of the problem, choosing program A and then program D does no longer have to be considered inconsistent, but rather an attempt to choose the optimal program, and therefore a relationship between being inconsistent in the Asian disease problem and irrationality in shopping behaviour should no longer be expected. A person who considers both options under the Asian disease problem and comes to the above conclusion might have used more time reasoning in order to reach a final decision and might actually be higher in cognitive ability in choosing A and D, than a person who chooses A and then C.

Secondly - relating to both the Asian disease problem and the CRT questions - it must be mentioned that 37.6 percent of the surveyed sample were university students who have been taught to be critical and analytical in their thinking and not rely on the first, automatic answer that comes to mind. When completing the Asian disease and the CRT questions, they may think twice and put in an extra effort when dealing with theoretical problems similar to university assignments, but while shopping they might not be using the same degree of analytical thinking; at least not consistently. These individuals may have a high cognitive ability due to schooling, but they may still be able to allow themselves some irrationality in shopping behaviour and shop irregularly – sometimes planned, sometimes on impulse, since they do not have extensive financial responsibilities. Considering the fact that this demographic made up such a large part of the survey, this may very well bias the outcome.

Despite the requirement that individuals were asked to complete the survey individually, some may have been provided the correct answer to the Asian Disease or the CRT questions from others who had already completed the survey, thus failing to demonstrate their own cognitive ability. When completing the second part of the survey, participants may give the wrong answer due to time pressure, erroneous beliefs about own shopping behaviour, etc.

### 5.1.2 Mood

Mood turned out to have no significant importance for determining 'Impulse Index', implying that impulse buys are not dependent on which mood the individual is

[35] Ibid.

experiencing. Impulse buying may be less associated with emotions than the assumptions behind this study states. In modern society quick thinkers and 'doers' are rewarded, hence impulse buying may constitute normal, every day purchasing behaviour and take place regardless of which mood the individual is in.

### 5.1.3 Age

The results do not support the assumption that impulsivity decreases with age, therefore, impulsivity in shopping behaviour is not higher in younger age groups. However, 76 out of the 102 participants in this study were between 15 and 30, thereby biasing the sample in terms of age. The results may not be completely accurate for testing impulsive shopping behaviour in relation to age, since individuals over 30 are underrepresented.

Most psychological and sociological theories regarding impulsivity and age relates to impulsivity in teenagers compared to adults.[36] Since the surveyed sample in this thesis are fifteen years of age or older, the sample might not accurately represent the demographic teenagers and may therefore not be able to predict any results based on previous research on impulsivity in teenagers compared to adults.

Financial responsibility normally increases with age, but it could also peak somewhere around the middle age when most children leave home, graduate from university and start working. Therefore, the assumption that financial responsibility increases linearly with age might not be realistic. Older individuals may be less financially restricted and thus able to shop more according to impulses.

### 5.1.4 Gender

Gender is uncorrelated with cognitive ability in this study[37] which is inconsistent with the prediction originating from Frederick's results (2005), but the results show that women are generally more impulsive in their shopping behaviour. This outcome is in line with the predictions for the results on basis of previous research. Being a woman increases the tendency to shop on impulse - not due to a lower cognitive ability but rather due to factors such as a larger available output of the kind of products which females tend to shop on impulse, gender differences in taste, fulfilling a stereotype of 'female shopping behaviour' etc. The University of Kent study showed that the products men tend to buy on impulse include electronic and sport equipment, while

[36] See for example McCown, Johnson, and. Shure, 1993.

women more often buy products with symbolic associations such as clothes, jewellery and cosmetics. Usually, the products men tend to buy on impulse are more expensive and restricted to certain stores, while the products women tend to buy on impulse are easily accessible and available in all price ranges, thus providing one explanation as to why women tend to shop more often on impulse. Another explanation could be that women generally spend more time in stores than men. If we assume that men and women are overcome by impulse attacks equally frequent, the chance that a woman is spending time in a store while receiving an impulse, is larger.

### 5.1.5 Education

According to the results from the survey, the assumptions that a higher education is correlated with a higher cognitive ability is valid, which is in consistent with Falch and Sandgren's study. However, since the primary assumption that cognitive ability influences impulsivity in shopping behaviour is not valid, there is no linking together education with a lower impulsivity in shopping behaviour. Reasons for this could be that people with a higher education have developed a personality in line with the hectic tempo of the professional life. A study at the University of Helsinki[38] showed that "professional personality" is related to impulsive buying behaviour. Ability to make quick decisions is appreciated in the work place, and this may very well become a habit not only professionally but also in personal shopping behaviour. Obviously, this does not mean that a higher education *always* corresponds to a higher impulsivity in shopping behaviour - as we have seen, education is not a statistically significant influence on impulsivity - but it can help explain why the assumption made earlier in the thesis, regarding education and impulsivity, does not seem to be valid.

### 5.1.6 Income

In this study, a larger income does not increase the tendency to shop on impulse. The assumption that an outward shift in the budget line increases the tendency to buy "luxury goods", i.e. impulse buys in this study, does not hold. This could imply that basic microeconomic may be quite right when it assumes that an individual buys more of the same goods when his or her income increases, as opposed to buying more luxury goods. However, another reason could be the fact that the participants were unevenly distributed with regards to income. 78 of the 102 participants in this survey

[38] Review of study at Helsinki University by Timperi (2000)
http://www.helsinki.fi/lehdet/uh/200e.htm

were from the lowest or mid-lowest income group, resulting in an outcome biased towards the lower income segments. Another explanation as to why 'Income' turned out to be of no significance for the model, could be that impulsivity is correlated more strongly to the individual's personality than to the same individual's financial situation. This, however, is more of a psychological research field and will not be explored further in this thesis.

### 5.1.7 Ethnicity

The variable 'Indian' reveals a positive influence on shopping impulsivity in the stepwise selection model. Given that Indians originate from a holistic culture, this result is in line with the assumptions made on basis of Hsee and Weber's findings. [39] Indians were expected to shop more on impulse since their culture is more about living in a community, where personal finances do no play the same vital role as in individualistic cultures, and risky economic behaviour may not have the same consequences. Being East Asian was also expected to increase impulsive index, given the assumption that Indians and East Asians both originate from holistic cultures and were expected to behave similarly. A possible explanation to why being East Asian was not found to be of significant impact for predicting 'Impulse Index', could be that many East Asians in New Zealand were sent over from their home countries for schooling purposes as children or teenagers, thereby implementing the individualistic culture in their way of living from an early age. This segment might have been overrepresented in the study since most of the East Asians who participated were attending university, usually indicating that they have been in the country for quite some time.

## *5.2 External Influence Index*

When measuring the tendency to buy items on impulse as a result from outside influences, cognitive ability, gender and ethnicity turned out to be of significant impact. Similar to the 'Impulse Index' model, the model obtained from the stepwise variable selection does not have a large enough explanatory value ($R^2$ is only 0.17) in order to be accounted for as a predictor model for tendency to be influenced by external circumstances. Despite the fact that the results do not provide a good

[39] Chinese (members of holistic cultures) tend to be more risk seeking than Americans (members of individualistic cultures). Hsee and Weber, 1999.

predictor model, discussing the impact of the independent variables is still relevant in order to make out an interpretation of the model and compare it with the obtained model for general 'Impulse Index'.

It is somewhat surprising that a higher cognitive ability makes for a higher tendency to be influenced by outside pressure since this result is the complete opposite to the predicted outcome according to the assumptions. One reason that the relationship between impulsivity and cognitive ability is the completely opposite to the expected, could be that cognitive ability in modern society is highly connected to emotional intelligence and tendency to take other people's feelings and advice into account, thereby resulting in a higher external influence index. Another reason could be that the majority of the survey sample which demonstrated a high cognitive ability belonged to a quite young age group which tend to be highly influenced by peer groups and surroundings such as advertising. Perhaps a different relation would have been discovered had an older demographic been surveyed.

Contrary to expectations, the ethnicity which tended to be most influenced by external influences turned out to be Europeans/NZ Europeans. The coefficient is quite large (0.40) indicating that being Europeans/NZ Europeans has quite a large influence on the tendency to buy items as a result of outside pressure. Instead of shopping according to own needs, the implications from living in an individualistic culture seem to be that such individuals are more inclined towards buying products recommended by the surroundings. Since being Indian increases the tendency to shop on impulse in the multiple regression model obtained earlier for 'Impulse Index', no general conclusion can be drawn from the results regarding ethnicity and impulsive shopping behaviour on basis of the individual being part of a holistic or an individualistic culture.

The fact that women tend to be more influenced by outside pressure than men when it comes to impulsive shopping, is in line with the expectations and with the results obtained for 'Impulse Index'. Besides, women are normally credited with a higher ability to listen to other people and weigh other people's opinions into account, which might correspond to a higher tendency to shop on impulse as a result from outside pressure. The impact of 'Gender' is slightly smaller in 'External Influence Index' (0.42) than in 'Impulse Index' (0.69), indicating that women are slightly less inclined to make impulsive shopping decisions as a result from outside influences only.

From a marketing perspective, a high tendency for an individual to be influenced by external circumstances is positive. A successful marketing campaign persuades consumers of a particular definition of reality, thereby making the product on offer attractive. Concentrating on the significant variables which are easy to measure, the result for 'External Influence Index' shows that white females tend to be more affected by external influences. Provided this model is an accurate representation of reality, marketing campaigns and business strategies trying to persuade buyers of a certain item, should target this segments.

## *5.3 Independent variables*

The fact that many results are out of line with the made assumptions can make for a certain degree of questioning of the independent variables. However, the quite large correlation between a lower CRT index, i.e. a higher cognitive ability and a higher education level, is consistent with Falch and Sandgren's findings. In turn, this indicates that the method used for measuring cognitive ability in this study is acceptable, since the obtained results are in similar to earlier studies regarding cognitive ability.

## *5.4 Final note on Rational Choice Theory*

The assumption that human cognition is of importance for determining rationality in shopping behaviour (i.e. a low impulsivity) has to be discarded. This implies that it is not valid to claim alterations of the basic assumptions underlying the rational choice model on basis of this study. However, it has been mentioned in other existing literature that human cognition is of impact for irrational economic behaviour, and Johnson-Laird and Byrne (1993) has proposed a model of rationality which lets varying cognition play a more important role in theories of rational thought.[40] The acceptance of such a model in economics will presumably require further extensive studies made in close cooperation with other social sciences such as psychology.

[40] Johnson-Laird and Byrne suggest attributing not perfect rationality to human beings, but rationality conditioned on only one meta-principle; people are programmed to accept interferences as valid, provided they have not constructed any mental model of the premises that contradicted the interference (Stanovich and West, 2000, p. 664)

# 6. Conclusions

*In this chapter, results and discussions will be concluded and the main findings summarized.*

Cognitive ability, tendency to contextualize, mood, age, education and income turned out to be uncorrelated and of no significant importance for determining 'Impulse Index'. The only variables which turned out to be of significant for determining impulsivity in shopping behaviour were 'Gender' and 'Ethnicity'. Since gender turned out to be uncorrelated with CRT scores, the fact that women tend to shop more impulsively could be related to the fact that women tend to buy products associated with symbolic and emotional images on impulse, and the market offers a large and accessible output of these kinds of products. Another explanation could be that women generally spend more time in stores than men, which in turn implies that the possibility for women to be overcome by an impulse while shopping, is larger. No general conclusion can be drawn from the results regarding ethnicity and impulsive shopping behaviour on basis of the individual being part of a holistic or an individualistic culture. 'Indian' turned out to have a positive significant impact in determining 'Impulse Index', while 'East Asian' proved to have a negative significant impact on the impulse index calculated as 'External Influence Index'. For 'External Influence Index', a high cognitive seems to predict a lower tendency to be influenced by external pressure when shopping. This could be explained by the fact that the majority of the sample was made up of quite a young age group which demonstrated a high cognitive ability due to schooling – the study showed a significantly positive correlation between schooling and cognitive ability - but generally tend to be more influenced by peer pressure and advertising.

The model obtained from the stepwise multiple regression for predicting 'Impulse Index' does not have a high explanatory value ($R^2$ is 0.09), why it should not be used as a predictor model for impulsive behaviour. This implies that the explanatory variables included in the study are not relevant enough for predicting impulsive shopping. It is also possible that some of the variables in the model give rise to biased results due to overrepresentation of certain demographics and underrepresentation of others. As for the dependent variable 'Impulse Index',

measuring shopping behaviour by questions in a survey instead of measuring by observations could result in biased, subjective answers on what constitutes buying 'unnecessary items', managing own finances well etc. It may be that the data would have turned out differently if we had followed the participants around and measured their economic behaviour on a 'standard scale', but it is also likely that such a study would have turned out biased.

Cognitive ability and tendency to be influenced by framing turned out to have no significant importance when determining general impulsivity in shopping behaviour. Therefore, cognitive ability and tendency to contextualize do not seem to be factors which bias the economic decision making process permanently. Rational choice theory cannot be proposed to be altered on basis on this study, but this implication could still be considered on basis of other findings and literature.

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## *Appendix 1*

## *Survey*

## *Master Thesis in Behavioural Economics*

**1.** Imagine that NZ is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows: If program A is adopted, 200 people will be saved. If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. Which of the two programs would you favour? (please circle)

**A** **B**

**2.** Imagine that NZ is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows: If program C is adopted, 400 people will die. If program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die. Which of the two programs would you favour? (please circle)

**C** **D**

**3.** A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? _____ cents

**4.** If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes

**5.** In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

**6.** When you go shopping, do you
- **A)** Only buy items that you need
- **B)** Sometimes buy items that you don't need
- **C)** Always buy items that you don't need

**7.** When shopping, do you buy items on impulse?
- **A)** Often
- **B)** Occasionally
- **C)** Very rarely/Never

**8.** When shopping, do you buy spontaneous presents and gifts to friends and family?

**A)** Often
**B)** Occasionally
**C)** Very rarely/Never

**9.** Do you consider yourself good at managing your personal finances? (i.e. making your money last throughout the week/month/semester, not buying expensive items on impulse etc)

**A)** Yes, very much
**B)** Moderately
**C)** No, not at all

**10.** When shopping, can any of the following factors be of influence for you to buy 'unnecessary' items that you were not planning to buy? *(please circle zero, one or more)*

**A)** Mood
**B)** Shopping partner's influence
**C)** Other people's influence (ex. surroundings, advertisements, peer pressure)
**D)** Shared ownership of item (ex. with friend, sibling, husband)

**Age** □15-20 □20-30 □30-40 □40-50 □50-60 □60→

**Gender** □ Male □Female

**Education** □ Secondary or below □ Tertiary or above

**Occupation …….**

**Income** □NZD15000 or below □NZD 15000-45000
*(per year)* □NZD45000-750000 □NZD 75000 and above

**Ethnicity……..**

**Thank you!**

## *Appendix 2*

*Crosstabulations from the survey*

**Table 2.1 Gender and Age**

Count

| | | Gender | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Age | 15-20 | 21 | 12 | 33 |
| | 20-30 | 22 | 21 | 43 |
| | 30-40 | 4 | 5 | 9 |
| | 40-50 | 5 | 4 | 9 |
| | 50-60 | 3 | 4 | 7 |
| | 60--> | 0 | 1 | 1 |
| Total | | 55 | 47 | 102 |

**Table 2.2 Gender and Education**

Count

| | | Gender | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Education | Secondary or below | 27 | 15 | 42 |
| | Tertiary or above | 28 | 32 | 60 |
| Total | | 55 | 47 | 102 |

**Table 2.3 Gender and Income**

Count

| | | Gender | | Total |
|---|---|---|---|---|
| | | Male | Female | |
| Income | 0-15000NZD | 28 | 22 | 50 |
| | 15000-45000NZD | 14 | 14 | 28 |
| | 45000-75000NZD | 7 | 8 | 15 |
| | 75000NZD and above | 2 | 1 | 3 |
| Total | | 51 | 45 | 96 |

**Table 2.4 Gender and Ethnicity**

Count

| | | Ethnicity | | | | Total |
|---|---|---|---|---|---|---|
| | | White | East Asian | Indian | Pacific Islander | |
| Gender | Male | 27 | 14 | 8 | 2 | 51 |
| | Female | 23 | 13 | 7 | 1 | 44 |
| Total | | 50 | 27 | 15 | 3 | 95 |