AN EXAMINATION OF SIMILARITY STRATEGY FOR INDIVIDUAL AND GROUP DECISION MAKING IN CHOOSING ALTERNATIVES INVOLVING TWO SEQUENTIAL INDEPENDENT EVENTS

Analisis Similarity Strategy untuk Pengambilan Keputusan Individu dan Kelompok dalam Pemilihan Alternatif yang Terdiri Atas Dua Peristiwa Independen Berurutan

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ABSTRACT

When providing a user with data, an accountant often must choose the proper level of report aggregation. Research in accounting has shown that the level of aggregation can affect the behavior of the decision maker. For example, when the decision maker is faced with choosing alternatives each of which involves two sequential independent events. Moser et al. (1994) found that individuals prefer the alternative for which the difference between the probabilities of success for the two independent events is small relative to the other alternative. The strategy that uses this pattern in decision-making is called the similarity strategy. In investment decision cases, a group makes most of the decisions. Stoner (1961) found that group decision-making was more extreme than individual. Therefore it is important to consider group decision-making in investment cases.

The purpose of this study is to investigate the similarity strategy, which was introduced by Moser et al. (1994). Testing is not only aimed at individual decision-making but also at group decision-making. Thirty-six graduate students in the management and accountancy departments participated in a laboratory experiment with investment decision setting. The results of the analysis support the similarity hypothesis. Under condition of joint probability, the similarity strategy used by groups is more pronounced than that used by individual (support Stoner, 1961), but not in the case of unequal joint probability. This result implies that when making an investment decision involving sequential events, group and individual decision-making will follow a particular pattern that does not conform to normative decision theory.

Keywords: *similarity strategy -- individual and group decision-making -- two sequential independent events.*

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BACKGROUND

According to normative decision theory, when the probabilities of success for two alternatives are equal, a decision maker should have no preference differences between alternatives. Ronen (1971, 1973) found that individual exhibit systematic preferences for alternatives with particular characteristics that are irrelevant according to normative decision theory. This situation happened when an individual made a choice between two alternatives, each of which has two independent stages. For example, when choosing between lottery tickets similar to those shown below, people generally choose ticket A rather than ticket B, even though the joint probabilities are equal (Ronen, 1971). The strategy that chooses the alternative with the highest probability in the first stage is called sequence effect.

	Ticket A	Ticket B
Probability of success In the first stage	0.90	0.20
Probability of success In the second stage	0.20	0.90
Joint probability Of success	0.18	0.18

The example above also describes the essence of the situation facing firms and individuals when they make resource allocation decisions. The accounting researchers who previously investigated such situations either discussed how such context-free decision problems map into resource allocation tasks (Ronen, 1973) or adapted a resource allocation task to fit the form of the lottery tickets shown above (Hirsch, 1978; Snowball & Brown, 1979).

Ronen (1973) provided examples of situations that fit the characteristics of the lottery tickets shown above. One such example involves the need to choose between two new products. One product is relatively easy to develop, but faces a low probability of success in the market (e.g. another over-the-counter pain killer). A second product has a riskier development stage, but is highly saleable if it can be produced (e.g. a drug that is very successful in combating cancer). The first product is the counterpart of ticket A, while the second product is the counterpart of ticket B.

Besides sequence effect (Ronen, 1971), there are three strategies that are used by decision makers in choosing alternatives involving two sequential independent events. The strategies are antisequence effect (Snowball & Brown, 1979), target-stage strategy (Lewis & Bell, 1985), and similarity strategy (Moser et al., 1994). Moser et al. (1994) found that similarity strategy tends to be used by individuals in choosing alternatives rather than the other strategies. Unfortunately, Moser et al. (1994) only considered individuals as decision makers. In this study the similarity strategy is investigated not only with individual decision-making but also group decision-making. There are two reasons why it is important to consider group decision-making. *First,* in resource allocation cases, a group makes of the decisions (Arnold & Sutton, 1997). *Second,* management accounting research has shown the importance of studying management accounting from a group perspective (Libby & Luft, 1993). Therefore, the purpose of this study is to investigate similarity strategy from the individual and group perspective, specifically, how it is used when the decision maker (individual and group) is faced with investment decision cases which involve two sequential independent events.

THEORETICAL ISSUES AND HYPOTHESES

Subjected Expected Utility (SEU)

Expected utility theory (Friedman & Savage, 1948) has historically served as both a normative and descriptive model of decision-making under risk. It assumes that individual is a rational decision maker (Rutledge & Harrel, 1994). The decision maker can process information perfectly and choose the best alternative (Morgan, 1986). The best choice according to this theory is an alternative that can maximize individual expected value (EV) (Ashton, 1982). Based on this axiom, when the two alternatives have equal EV, normative theory predicts that subjects will be indifferent to alternatives. For unequal EV, normative theory predicts that subject will always prefer the ticket with the higher EV.

Ronen (1971, 1973) investigated whether subjects maximize expected values in choices involving two-stage decision process. Expected value could be maximized in these studies by maximizing the joint probability of the occurrence of two sequential events. Ronen (1971) presented 22 graduate business school students with two sets of two bags, each bag containing specified proportion of marbles of different colors. The objective was to choose between the two sets of bags such that a blue marble could be drawn from the first bag followed by a red marble from the second bag. The joint probability (EV) of drawing of blue marble from bag 1 and a red marble from bag 2 was identical the two sets of bags (for

16 of 20 trails), but the first-stage probabilities of drawing a blue marbles from bag 1 differed between the two sets. Therefore, subjects who follow an expected value decision rule should be indifferent between the two sets, but subjects who employs a "discounting" strategy for second-stage probabilities should systematically prefer the set in which the first-stage probability of drawing a blue marble from bag 1 is higher. Seventeen of the 22 subjects choose the set in which the first-stage probability of success was higher, despite the equivalence of EV between the two sets.

In the case of unequal joint probabilities, some research also found non-normative behavior, which not conform to normative theory. Such behavior has been reported in studies using accounting tasks (Hirsch, 1978; Snowball & Brown, 1979) as well as in studies using abstract lottery settings (Ronen, 1971, 1973; Lewis & Bell, 1985).

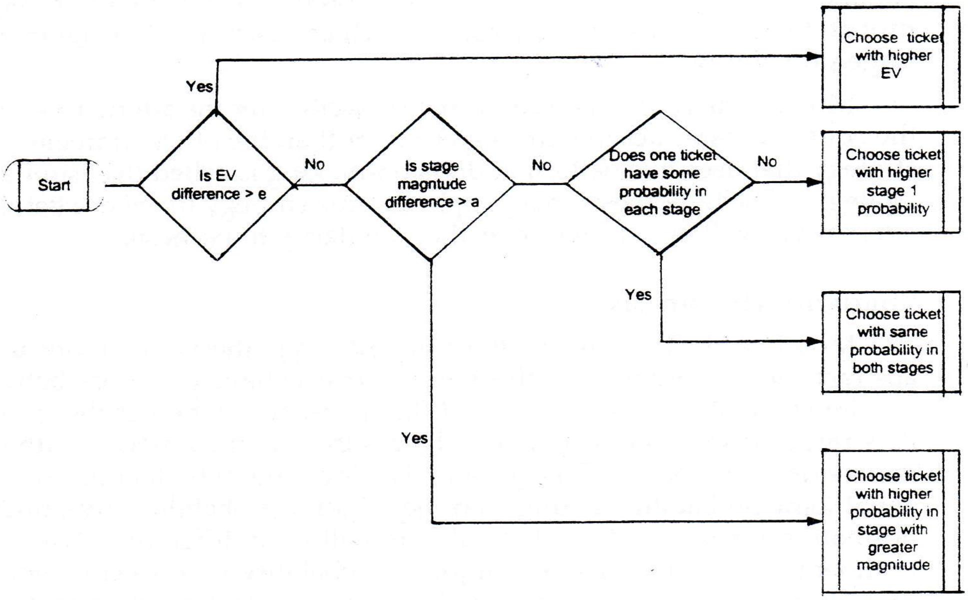
Previous accounting research in this area has attempted to explain non-normative behavior in settings such as those described above by identifying strategies used by decision makers to choose between alternatives. The four strategies identified in the prior research are:

1. Sequence effect ('stay-in the game strategy): choose the alternative with the highest probability in the first stage (Ronen, 1971, 1973; Hirsch, 1978; Snowball & Brown, 1979; Hogarth, 1981; Lewis & Bell, 1985).
2. Antisequence effect: choose the alternative with the highest probability in the second stage (Snowball & Brown, 1979).
3. Target-stage strategy: first determine whether one stage dominates the other. One stage is said to dominate the other if the first (second) stage probabilities of both tickets are higher by a threshold amount than the second (first) stage probabilities of both tickets. If one stage dominates the other, choose the alternative with the highest probability of success in the dominant ('target') stage.
4. Similarity strategy (Moser et al., 1994): choose the alternative with the equal probabilities in both stages.

Similarity Strategy

Moser et al. (1994) study was based on information-processing model of choice between pairs of two-stage sequential lotteries. The model was first developed by Lewis and Bell (1985) (Figure 2.1).

Fig. 2.1An information-processingmodel of choice between pairs of two-stage sequential lotteries, e and a are individual threshold values (adopted from Lewis & Bell, 1985)



Source:Moser, V. D., Birnberg, J. G. and Do, S., A Similarity Strategy for Decisions Involving Sequential Events, *Accounting Organization and Society* (1993): 442.

The model is described as follow: At some threshold level, subjects choose the lottery (ticket) with the higher expected value. Below that threshold subjects focus on the difference in magnitude of the probabilities in stage one and stage two. When the difference is sufficiently large, subject search for the stage with the greater magnitude and chooses the lottery (ticket) with the larger probability in that stage (i. e. the target stage). When magnitude differences are not sufficiently large, most subjects choose the ticket with the higher first stage probability of success (Lewis & Bell, 1985).

Note that Lewis and Bell's model suggests that when neither stage dominates, subjects choose the alternative with the higher first stage-probability. Thus, for the most part, their model is consistent with the sequence-effect hypothesis described earlier. The target-stage strategies apply to a limited number of cases because only in special cases would one stage be likely to dominate the other. Lewis and Bell (1985) reported an interesting exception to the sequence-effect hypothesis that could not be accounted for by any of the choice strategies identified in the previous literature. The exception is as follow: whenever one of the tickets has equal probabilities in both stages, subjects prefer the ticket with the equal probabilities in both stages regardless of which tickets has the higher first-stage probability.

Moser et al. (1994) has found that subject prefer the alternatives with the equal probabilities in both stages rather than the other strategies. The strategy that uses this pattern in decision-making is called the "similarity strategy." The hypothesis that people use this strategy to choose between alternatives will be referred to as the "similarity hypothesis."

Similarity Hypothesis

Moser et al. (1944) tested the similarity hypothesis in studies using abstract lottery settings.[1] In this study, subjects have to choose between two investments (investment A and B). The issue is whether the similarity strategy leads subjects to make choices that are inconsistent with normative decision theory. This question is addressed in both equal and unequal joint probability settings. For equal joint-probability investments, normative theory predicts that subjects will be indifferent between investments A and B. For unequal joint- probability investments, normative theory predicts that subject will always prefer the investment with the higher joint probability. In order to contradict normative theory prediction, the following alternative hypothesis is presented:

H1: In the case of equal joint probability, subjects will prefer alternatives with the probability of success similar in both stages (subjects prefer investment B to investment A).

H2: In the case of unequal joint probability, subjects still choose alternatives with the probability of success similar in both stages (investment B).

The similarity hypothesis is examined further by investigating whether the degree to which stage probabilities of a investment are similar relative to the alternative investment affects subjects' choices. This question is investigated by varying the stage-probability spread (i. e. the intra-investment probability spread) in investment (B) with the more similar stage probabilities (see Table 2.1). If subjects use similarity strategy for decision-making, the preference for investment B will decreases as the spread between the first-stage and second-stage probabilities of investment B increase (Moser et al., 1994). In order to test this statement, the following alternative hypothesis is presented:

H3: The more the stage-probability spread of investment B decreases, the more subjects like it.

A final test of the similarity hypothesis compares it directly against the alternative choice strategies hypothesized in the prior study. The comparisons are accomplished by varying the structure of the investments (i.e. the order of the stage probabilities within the investments, see Table 2.1) in such a way as to lead to different predictions for the competing hypotheses. In the case of equal joint probability, the similarity hypothesis predicted subjects would prefer investment A to investment B when the investment is presented in 1, 2, 3, and 4 structures (Moser et al., 1994). So to test this hypothesis, the following alternative hypothesis is presented:

H4: In the case of equal joint probability, subjects would prefer investment A to investment B when investment is presented in 1, 2, 3, and 4 structures.

Table 1. Equal joint-probability investments

	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200
0,031	First-stage probability	0,900	0,432	0,900	0,463	0,222	0,432	0,222	0,463
	Second-stage probabili	0,222	0,463	0,222	0,432	0,900	0,463	0,900	0,432
	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200
0,069	First-stage probability	0,900	0,414	0,900	0,483	0,222	0,414	0,222	0,483
	Second-stage probabili	0,222	0,483	0,222	0,414	0,900	0,483	0,900	0,414
	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200
0,109	First-stage probability	0,900	0,396	0,900	0,505	0,222	0,396	0,222	0,505
	Second-stage probabili	0,222	0,505	0,222	0,396	0,900	0,505	0,900	0,396
	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200
0,151	First-stage probability	0,900	0,378	0,900	0,529	0,222	0,378	0,222	0,529
	Second-stage probabili	0,222	0,529	0,222	0,378	0,900	0,529	0,900	0,378
	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200
0,195	First-stage probability	0,900	0,360	0,900	0,555	0,222	0,360	0,222	0,555
	Second-stage probabili	0,222	0,555	0,222	0,360	0,900	0,555	0,900	0,360
	Joint probability	0,200	0,200	0,200	0,200	0,200	0,200	0,200	0,200

Group Decision-Making

Group-shift research was first introduced by Stoner (1961), and indicated that groups produce risky shifts in decision making.[1] While research in the 1970s produced some anomalous findings, most supported theories of a group-induced process toward either risky or cautious decision-shifts. That is, research has shown that group interaction leads to decisions, which are more extreme than individual decisions.

The psychology literature is replete with studies of the group-shift phenomena. These studies have attempted to determine whether group decisions are more risky or cautious as compared to the pregroup-individual risk preferences. A shift in risk-taking is said to occur when the initial prediscussion positions of individual group member are enhanced subsequent to group discussion (Isenberg, 1986).

A substantial number of theories have been developed to explain the possible effects of group-shifts. Table 2 summarizes those theories.

Many studies have attempted to explain or exhibit group-shifts. One of the first and most appealing explanations of group-shifts (Brown, 1965) is the social comparison theory, which suggest that people are continually attempting to be viewed as more "socially favorable" than average. Group interaction allows members to compare their positions to the rest of group. Once a social comparison is made, members attempt to adjust their self-perception (and the perception of others) to be more extreme in the socially favorable direction, which can lead to similarity strategy or the other strategies (i. e. sequence effect, anti-sequence effect, and target stage strategy).

Moser et al. (1994) found that individuals in choosing alternatives involving two sequential independent events more frequently used similarity strategy. That is, the similarity strategy is viewed as socially favorable. Based on this argument, the author expect, the similarity strategy used by groups will be more extreme than that used by individuals. The hypothesis is examined in the case of equal and unequal joint probability. In order to examine this issue, the following alternatively formulated hypothesis is presented:

H5a: In the case of equal joint probability, the similarity strategy used by groups is more extreme than that used by individuals.

H5b: In the case of equal joint probability, the similarity strategy used by groups is more extreme than that used by individuals.

Table 2. Summary of group polarization theories

Theory	Primary Developer	Explanation
Diffusion of Responsibility	Wallach et al. (1964)	Risky shifts occur because no one individual is responsible for the group decision.
Affective Bonds	Wallach et al. (1965)	Bond (cohesion) between group members cause responsibility diffusion (similar to diffusion-of-responsibility)
Social Comparison	Brown (1965)	Individual behavior is culturally prescribed whereby they want to be at least as risky as similar persons.
Relevant Arguments	Brown (1965)	Group discussion increases the salience of values from initial decision-making. A greater proportion of arguments will favor the salient values thus causing a risk shift.
Familiarization	Bateson (1966)	Increased familiarity with relevant decision elements is obtained through group interaction which causes increased risk taking.
Anonymity	Burnstein (1967)	A positive relationship exists between the number of group members and magnitude of risk shifts.
Rhetoric-of-risk	Kelly & Thibaut (1969)	The rhetoric of risk is intense and dramatic, thus influencing group members.
Leadership	Burnstein (1969)	Extreme risk individuals are more confident than moderates and thus exert more influence on the group.
Pluralistic Ignorance	Levinger & Schneider (1969)	Individuals present their positions as compromises between their "ideal" and their impression of the group tendency. Position can shift when the true group tendency is known.
Commitment	Moscovici & Zavalloni (1969)	Interaction causes bonding to a choice and thus commitment.
Release	Pruitt (1969)	Individuals constrain themselves to avoid being nonconformists. They are released from this constraint in group when they observe views similar to their true views.
Decision/Expected Utility	Vinokur (1971)	Group discussion either changes outcome utilities or leads to a convergence of utilities related to outcomes thus leading to risky or cautious shifts.

Source: Rutledge, R. W. and A. M. Harrel, The Impact of Responsibility and Framing of Budgetary Information on Group Shifts, *Behavioral Research in Accounting* (1994): 6:94

RESEARCH METHOD

Subjects

The subjects were thirty-six graduate students in the management and accounting departments, all of whom had completed, undergraduate and graduate-level statistics, and undergraduate management accounting course. Half of the subjects (accounting students) had also completed graduate level management accounting course.

Experimental Design

Table 3. Experimental design

Factors	Levels
Between-subject factor:	
Joint probability	Equal
	Unequal
Within-subject factors:	
Stage probability spread	0,006
	0,031
	0,069
	0,109
	0,151
	0,195
Structure	1
	2
	3
	4

Independent Variables

As shown in Table 3, there are three independent variables examined in the experiment:

1. Joint Probability

Joint probability is a between-subject factor with two levels: Equal and Unequal. Under the equal condition, the joint probability of investment A was equal to the joint probability of investment B (see Table 2.1). Under the unequal condition, the joint probability of investment A always exceeded the joint probability of investment B, and thus, according to normative theory, subjects should always choose investment A. The unequal joint-probability condition was constructed by increasing the joint probability of success for investment A in each of the 24 equal joint-probability investments shown in Table 2.1 while holding constant the joint probability of investment B.[1]

2. Stage-Probability Spread

Stage-Probability Spread refers to the absolute difference in the probability of success between the first and second stages of investment B. This factor is a within-subject factor that was varied at six levels (0.006, 0.031, 0.069, 0.109, 0.151, and 0.195), as shown in Table 2.1. The stage-probability spread for investment A was held constant at approximately 0.68 for two reasons. *First,* this avoided confounding the effect of a shift in the stage-probability difference in the unequal joint-probability investments. *Second,* this resulted in the stage-probability spread for investment B always being smaller than the stage probability spread for investment A.

3. Structure

Structure is a within-subject variable that refers to the order of the stage probabilities within investment A and investment B. Structure was varied at four levels, as shown in Table 2.1. These four levels represent all possible orders of stage probabilities given that, by design, investment B always had a smaller stage-probability spread than investment A. Manipulation of this factor led to different predictions for the similarity hypothesis versus the competing hypotheses, and thus made it possible to assess whether the similarity hypothesis or one of the competing hypotheses best explained subjects' choices.

Dependent Variable

Dependent variable is weighted choices. The weighted choices measure reflects the degree to which that choice was preferred to the alternative. The measure was calculated by converting the raw preference ratings (responses on the five-point preference scale) to values ranging from 1 to 9, using the following procedure: if investment A was chosen, the weighted-choice measure was calculated by subtracting the raw preference rating from 6; if investment B was chosen, the weighted-choice measure was calculated by adding 4 to the raw preference rating. Thus, higher weighted-choice measures will generally correspond with a higher percentage of choices of investment B, and lower weighted-choice measure will generally correspond with a lower percentage of investment B choices.

Experimental Task

Each subject was given two booklets that contained 48 investments (24 for equal joint probability and 24 for unequal joint probability). Each investment was on separate page. Subject were required to choose either investment A or investment B for each of their 48 investments. After making a choice, subjects rated the degree to which they preferred the investment they choose over the investment they did not choose on a scale numbered 1-5, with endpoints labeled "very not interesting" (1) and "very interesting" (5). A full set of instructions is provided in Appendix B.

The final part of the experiment began with the random assignment of individuals to groups. First the groups were asked to read through the case one more time, and after sufficient discussion within the group, to make a "group decision."[2] Group discussions lasted approximately fifty to sixty minutes.

Results

Manipulation Check

To test whether the independent variables had an effect on subjects' choices (preferences) an ANOVA was conducted. As can be seen in Table 4.1, all three independent variables had a significant main effect on subjects' choices ($p<0.05$), except the stage probability spread variable, which was only marginally significant. The ANOVA result also showed that there was not a significant interaction effect between all three independent variables.

Hypotheses Testing

Hypothesis 1

The purpose of the first hypothesis is to test whether in equal joint probability conditions, subjects will prefer investment B to investment A. Contrary to normative theory prediction, which expects no difference in subjects' choice (mean = 5), Table 4.2 shows the subjects' mean weighted-choice is 6.20. The upper-tail Z test reports that the weighted-choice measure for the equal joint-probability condition (mean = 6.20) significantly exceeds ($p < 0.05$) the normative theory prediction of 5.00. Hence, results support H1.

Table 4. ANOVA for weighted-choice measure (n = 1728)

	df	F-statistic	p value
Between-subject factor			
Joint Probability	1	35.889	0.000*
Within-subject factors			
Structure	3	2.939	0.032*
Stage Probability Spread	5	2.205	0.051*
Interactions			
Structure x Stage Probability Spread	15	0.309	0.995
Joint Probability x Structure	3	0.210	0.889
Stage Probability Spread x Joint Probability	5	0.330	0.895
Joint Probability x Stage Probability Spread x Structure	15	0.205	1.000

*p , 0,05

Table 5. Weighted choice for equal joint-probability condition

Stage	Structure				Mean
Probability Spread	1	2	3	4	
0.006	5.94	5.94	6.47	6.83	6.30
0.031	6.47	5.92	6.56	6.97	6.48
0.069	6.31	6.14	6.78	6.53	6.44
0.109	5.81	5.53	6.03	6.31	5.92
0.151	5.86	5.81	6.25	6.22	6.04
0.195	5.69	5.89	6.11	6.47	6.04
Mean	6.01	5.87	6.37	6.56	6.20

Hypothesis 2

The purpose of the second hypothesis is to test whether in unequal probability conditions, subjects still have preference for investment B. Contrary to normative prediction, which expects subjects will prefer investment A to investment B (mean = 1), Table 4.3 shows the subjects' mean weighted-choice is 5.31. The upper-tail Z test reports that the weighted-choice measure for the equal joint-probability condition (mean = 5.31) significantly exceeds ($p < 0.05$) the normative theory prediction of 1.00. Hence, results support H2

Tabel 6. Weighted choice for unequal joint probability condition

Stage	Structure				Mean
Probability Spread	1	2	3	4	
0.006	5.61	5.28	5.92	5.89	5.68
0.031	5.47	5.31	6.17	5.94	5.72
0.069	5.39	4.94	5.89	5.08	5.33
0.109	4.61	4.78	5.31	5.64	5.09
0.151	4.86	5.11	4.61	4.89	4.87
0.195	5.50	4.94	4.92	5.42	5.20
Mean	5.24	5.06	5.47	5.48	5.31

Hypothesis 3

The purpose of the third hypothesis is to test whether the increasing stage probability spread of investment B will affect subject's choice. The Similarity hypothesis predicts that the preference for investment B decreases as the spread between the first-stage and second-stage probabilities of investment B increase. The significant (marginally) main effect of the stage probability spread factor ($p<0.05$, Table 4.1) provides evidence consistent with the similarity hypothesis. Table 4.2 and Table 4.3 also report the subjects' mean weighted-choices decrease as the spread between the first-stage and second-stage probabilities of investment B increase. Thus, H3 is supported.

Hypothesis 4

The fourth hypothesis is aimed to test whether the similarity hypothesis prediction is better than those predicted by the other hypotheses (sequence effect, anti-sequence effect, and target stage). Table 4.4 provides predictions (under the equal joint-probability condition) for the similarity hypothesis and for the three competing hypotheses. Table 4.5 shows the result of upper-tail Z test. As can be seen in Table 4.5, subjects' mean weighted-choices for all structures significantly exceed ($p<0.05$) the competing hypotheses of 5. Thus, H4 is supported.

Table 7. Predicted investment choices for the equal joint-probability condition

	Structure			
Hypotheses	1	2	3	4
Similarity	B	B	B	B
Sequence effect (Stay-in-the game)	A	A	B	B
Anti-sequence effect	B	B	A	A
Target Stage	N/A	A	A	N/A

Hypothesis 5

The fifth hypothesis is aimed to test whether the similarity strategy used by groups is more extreme than that used by individuals. First ANOVA was used to verify whether the groups that were formed were perfectly random for age, GPA, semester, gender, and department. Table 4.6 shows that p value for age, GPA, semester, and department exceed a = 0.05. It means that there are not significant differences between group for age, GPA, semester, and department.

Table 8. Upper-tail Z test for each structure

Structure	Mean	Standard Deviation	Z	p value
1	6,01	3,12	4,76	0.000*
2	5,87	3,07	4,16	0.000*
3	6,37	2,90	6,94	0.000*
4	6,56	2,77	8,28	0.000*

*p<0.05

n = 216

Randomization is not successful for gender (p<0.05) classification. The implication is, if the decisions that are made by groups with only male members are different from those made by groups with only female members, it will affect the research results (especially for H5a & H5b). Then, to test whether there are differences in the decisions made by all-male groups and all-female groups, a two-tail Z test is conducted. Table 4.7 shows that all-male groups' decisions differ significantly from all-female groups' decisions (p<0.05) under unequal joint-probability condition, but do not differ under equal joint-probability condition (p>0.05).

Finally, to test the fifth hypotheses (H5a & H5b), upper-tail Z test was conducted. Table 4.8 shows that the groups' weighted-choices under equal joint probability condition (mean = 6.57) significantly exceeds individuals' weighted-choice (mean = 6.20) (p<0.05). Thus, H5a is supported. But in the case of unequal joint probability, the groups' weighted-choices (mean = 5.57) do not significantly exceed individuals' weighted-choices (mean = 5.31) (p>0.05). Hence, H5b is not supported.

Table 9. ANOVA for groups demography characteristic

		Sum of Squares	Df	Mean Square	F	Sig.
GE	Between Groups	70.667	11	6.424	.650	.769
	Within Groups	237.333	24	9.889		
	Total	308.000	35			
PA	Between Groups	1.055	11	9.594E-02	1.954	.082
	Within Groups	1.178	24	4.909E-02		
	Total	2.234	35			
EMESTER EVEL	Between Groups	16.333	11	1.485	2.138	.058
	Within Groups	16.667	24	.694		
	Total	33.000	35			
ENDER	Between Groups	4.889	11	.444	2.667	.022
	Within Groups	4.000	24	.167		
	Total	8.889	35			
EPARTMENT	Between Groups	2.083	11	.189	.974	.494
	Within Groups	4.667	24	.194		
	Total	6.750	35			

Table 10. Z test - weighted choices' all male groups and all-female groups

	Joint Probability			
	Equal		Unequal	
	Male	Female	Male	Female
Mean	7,17	6,69	7,02	4,19
Sample	48	96	48	96
Standard Deviation	3,12	2,50	3,29	2,97
Z	0,93		5,02	
P value	0,18		0,000*	

*p < 0,05

Table 11. Z test-weighted choices[1] groups and individuals

	Joint Probability			
	Equal		Unequal	
	Groups	Individuals	Groups	Individuals
Mean	6,57	6,20	5,57	5,31
Sample	288	864	288	864
Standard Deviation	2,91	2,98	3,32	3,17
Z	1,85		1,18	
P value	0,03*		0,12	

*$p < 0,05$

5. Discussions And Conclusions

The results of this study provide support for similarity hypothesis (support Moser et al., 1994). This study provides evidence that the similarity strategy tends to be used by individuals and groups in investment choice involving two sequential independent events. The superiority of this strategy is more pronounced when groups make of decisions, especially in the case of equal joint probability. This result is consistent with Stoner (1961) who found that groups' decision-making was more extreme than individuals' decision-making.

This study does not support the superiority of the similarity strategy when groups make decisions in the case of unequal joint probability. One possible explanation for this is that when the joint probability of investment A is higher than investment B, according to normative theory; investment B appeal should decrease. Table 4.8 shows that the groups' weighted choices under equal joint probability conditions (means = 6.57) is higher than the group's weighted choices under condition unequal joint probability (means = 5.31).[1] The decreased preference for investment B under unequal joint probability conditions is showed clearly by all-female groups (Table 4.7). The evidence that all-female groups tend to follow normative theory was not predicted by the author. The possible explanation of this phenomenon is that there is a different risk preference between all-male groups and all-female groups. In this case, all-female groups tend to be risk averse and all-male groups tend to be risk taker.

One possible explanation for why alternatives for which the two-stage probabilities are similar are preferred is that individuals mentally code stage probabilities (and hence the related alternative) as acceptable or unacceptable rather than at their precise numerical values. For example, for the investments with stage probability spread 0.006 and structure level 4 (see Table 2.1), both of the similar probabilities in investment B (0.450 and 0.444) may be coded as acceptable. In contrast, in investment A, the 0.90 probability may be coded as acceptable, while the 0.222 probability may be coded as relatively unacceptable. Thus, the overall assessment of investment B would be that it is acceptable, while the overall assessment of investment A would be that it is unacceptable relative to investment B.

6. Implications, Limitations, And Future Research

The findings suggest that the manner in which information is presented can affect the behavior of decision makers. This study provides evidence that the level of aggregation can affect individual and group decision-making. Especially, when the decision maker is faced with choosing investments involving two sequential independent events. In this case, the decision maker (group and individual) will follow a particular pattern that does not conform to normative theory. Thus, this finding has implication to management accountants in presenting data (whether aggregated vs. disaggregated format) to managers.

The limitations of this research are the use of the laboratory experiment method, the failure of randomization for gender classification (affect results for H5b), and the use of students as subjects. Laboratory experimentation allows decision-making behavior to be studied in a controlled environment and thus has the potential for high internal validity, but relatively low external validity. Hence, caution should be used in generalizing the results of such experiments to other groups, individuals or situations. Another of the limitations in generalizing this study is the use of students as proxy for managers. There is a possibility that the students' decisions are not representative of actual managers' decisions.

This study suggests some issues for future research. First, future study could replace the experimental setting with real-world resource allocation cases. Second, the use of actual managers as subjects performing more realistic tasks would be helpful in sorting out the effects of experience on choice behavior. Third, future work should consider individual risk preference and gender issues.

1. The author modified experimental design that used by Moser et al. (1994) in accounting task. Therefore, subject would be faced on investment choosing and not lottery choosing.

2. Group-shift is also often referred to as "group-induced shift" (see Dion et al., 1970), "choice-shift" (see Crott et al., 1986; Pruitt, 1971), or "risky-shift" (see Cartwright, 1971).

3 In the Unequal Joint-probability condition, the difference in joint probability between investment A and investment B was varied at four levels corresponding to those used by Lewis & Bell (1985) and Moser et al. (1994). The levels represent multiplicative differences in joint probabilities ranging from 0.02 to 0.08, in increments of 0.02. For example, at level 0.08, the joint probability for investment B (20%) was multiplied by 1.08 to arrive at the joint probability of investment A (21.6%). The quadratic formula was used to calculate the stage probabilities necessary to produce the joint probability of investment A, while holding the stage probability spread of investment A constant at 0.68. The level of joint-probability difference was randomly assigned to each of the 24 investments presented to each of the subjects in the Unequal Joint-probability condition.

4 The task was given to the groups was similar with the task was given to the individuals.

5 ANOVA showed that joint probability had a significant main effect on groups' choices ($p < 0.05$).

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