

EXPLORING THE RELATION BETWEEN MACH SCORES AND RISK ATTITUDE: EMPIRICAL FINDINGS FROM INDIVIDUAL VERSUS GROUP TESTING

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Abstract

Our research delves into the correlation between Mach scores and risk attitudes in both individual and group testing. We conducted a quasi-experiment involving accounting students and performed a statistical analysis of the data. Our findings reveal two key points: firstly, individuals with high Mach scores tend to be more inclined towards risk-taking compared to those with low scores on the Mach IV scale; and secondly, high Mach scores exert a greater influence on group decision-making. Our results underscore the distinction between group and individual behavior in terms of risk attitudes and highlight the predictive utility of the Mach-IV scale in assessing risk attitudes.

Key words: *Machiavellianism; Mach IV scale; risk attitude; individual level; group level*

JEL Classification: *M40, M41*

INTRODUCTION

Although individual decisions form the basis for most normative models of economics, the reality is that the vast majority of decisions are made in groups, such as management teams, governing bodies, and business partners. Therefore, it is crucial to understand the dynamics of group decision making.

In their 1976 study, Lamm and Myers explored the group polarisation phenomenon, identifying two main classes: social-emotional dynamics and rational-cognitive determinants. The first, labelled affective hypotheses by Vinokur (1971), focusses on affective interdependencies and emotionally charged interpersonal connections, as emphasised by Wallach and Kogan (1965). In contrast, the rational-cognitive approach (Burnstein et al., 1971) is based on informational influence dynamics. Previous studies have shown that individuals' decision-making processes are influenced by a complex combination of factors. For example, investment decisions are influenced by factors such as age, gender, level of income, and level of education as earlier studies documented (Maxfield and Shapiro, 2010; Bali et al., 2009; Hallahan et al., 2003). Empirical studies conducted by Chitra and Sreedevi (2011) and Mishra et al. (2010) have highlighted the important role of personal characteristics (e.g., personality traits, emotions, and values) in the decision-making process. Additionally, research by Young et al. (2012) has shown that personality traits are key determinants of individuals' risk-taking attitudes and investment decisions.

One of the most widely studied personality traits in psychological research is Machiavellianism. Over the past five decades, researchers have scrutinized this trait for its potential to explain variations in human behavior across different contexts and interactions. The original Mach IV scale, developed by Christie and Geis in 1970, has been extensively used in psychological studies and, more recently, in interdisciplinary research to assess the complexity of human behavior.

According to the empirical findings of Geis and Levy (1970), individuals with high Mach personality traits are adept at perceiving how others would respond to the Mach scale compared to those with low Mach traits. Additionally, high Mach individuals tend to be more loquacious, as documented by Geis et al. (1970b) and are

perceived as having the ability to manipulate and persuade others in their group to adopt a certain attitude. Other studies, such as those conducted by Rim (1966), have found that individuals with high Mach traits tend to dominate group discussions, take more risks than those with low Mach traits, and influence the group towards risky decisions. Overall, high Mach individuals are known in the literature for attempting to control the behavior of others and persuade them, especially when they have something to gain from the situation (Burns et al., 2024; Gu et al., 2017; Christie and Geis, 1970a).

Our study aims to explore the connection between the Machiavellian personality trait and risk taking. We want to assess whether attitudes toward risk can be influenced by Machiavellian predisposition. To do this, we divided participants into two groups: those with high Machiavellian traits and those with low Machiavellian traits. In previous studies, it has been found that individuals with high Machiavellian traits are more likely to take risks (Geis and Christie, 1970a). However, individuals with low Machiavellian traits are more closely associated with social and emotional dynamics. We expect that their attitudes towards risk may change more frequently compared to those with high Machiavellian traits, shifting between risk aversion and risk propensity. Additionally, individuals with high Machiavellian traits, representing rational-cognitive dynamics, are expected to have similar attitudes toward risk taking in group testing as they did in individual tests. Another interesting aspect of our study is related to the fact that we examined both high and low Machs paired in a special context, where high Machs cannot win anything in the short term or from that context, except for the desire to control the structure of the situation. In our research design, there is nothing for high Machs to gain.

As posited by Christie and Geis (1970a), high Mach individuals, when confronted with low Mach individuals in situations offering opportunities for manipulation, tend to assert control and strive for victory. Conversely, those with low Mach scores are inclined to become emotionally engaged with others' feelings and may consequently lose out to the high Mach individuals.

Our study aims to understand how individuals respond to risk aversion or propensity based on their psychological traits. Previous studies have only examined individuals to assess the differences between high and low Machs. Despite their popularity and valuable results, important research questions remain. Do low Machs become dominated by high Machs in their decisions when paired together? Do high Machs attempt to dominate low Machs when in a group in order to lead the group's decision and align it with their vision? Who has a greater impact on group decisions, Highs or Lows?

The importance of our study lies in our endeavour to incorporate insights from human psychology into financial decision making, thereby offering new perspectives to understand and predicting human behavior. Consequently, our work can have a significant impact on the business environment and beyond, as previous scholars have observed that psychological factors remain influential in the interactions of economic agents (Shiller, 1981, 1984).

Our study contributes to the existing body of literature that seeks to understand how individuals' psychological traits influence their financial decision-making, given the complexity of human behavior. Specifically, we focus on the interplay between exploitative and cooperative behaviors, with Machiavellianism being a key factor in manipulative strategies during short-term interactions (Wilson et al., 1996). Our research aligns with Shultz's (1993) view that individual differences in Machiavellianism can have significant real-world implications, similar to those observed in short-term laboratory experiments. Understanding the impact of Machiavellianism is particularly relevant in business environments, where the ability to manipulate others is sometimes considered a form of social intelligence. Therefore, our study aims to shed light on the diversity of social strategies in human life and the determinants of choice behavior.

The subsequent sections of the paper are structured as follows: section two provides the state-of-the-art and research hypotheses, section three provides details about the methodology, followed by the presentation of our findings and discussion. The final section offers a conclusion for the paper.

I. STATE OF THE ART

The extensive body of psychological literature on Machiavellianism is based on the work of Christie and Geis (1968, 1970a, 1970b), who were the first psychologists to develop a series of tests for assessing this trait. The tests included statements such as "The best way to handle people is to tell them what they want to hear" and "It is hard to get ahead without cutting corners here and there" in the Mach IV scale. By measuring respondents' agreement with these statements, the authors were able to calculate high and low scores, which are known in the literature as high Machs versus low Machs. The Mach IV scale, developed by Christie and Geis (1970a), consists of 20 items categorised into Machiavellian tactics, views of human nature, and abstract morality, and has been used in multiple empirical studies to measure the Machiavellianism trait.

Research conducted in laboratory settings has demonstrated that individuals with high Machiavellian traits are more inclined to manipulate others against their best interests. It is widely accepted that such individuals are more likely to use exploitative tactics (Harell, 1980). Conversely, individuals with low Machiavellian traits are

driven by emotional involvement with their partner, as opposed to high Machs, who are motivated by the strategic consequences of their actions (Cooper and Peterson, 1980).

The main characteristics associated with high Machs, as observed by previous studies (Christie and Geis, 1970a; Grams and Rogers, 1989), include being less easily swayed and persuaded by others, having the ability to influence others but being rarely influenced themselves, tending to be manipulative and deceptive to achieve their goals, being more successful in negotiation and bargaining roles, employing various influencing tactics to control information and communication, and extensively using positive emotional persuasion techniques.

When evaluating individuals with high Machiavellian traits, it is evident that prioritising the end goal is a prominent characteristic (Gunnthorsdottir *et al.*, 2002). Despite their rationality, detached demeanor, and materialistic outlook, these individuals consistently identify the most effective strategies for various situations (Gunnthorsdottir *et al.*, 2002; Christie and Geis, 1970a).

Christie and Geis (1970a) observed that individuals with high Mach personality traits are typically more disturbed by inefficiency than by injustice. They continuously test their boundaries and are less influenced by emotions, enabling them to detach themselves from moral concerns, particularly when anticipating material rewards, in contrast to individuals with low Mach personality traits (Christie and Geis, 1970a).

Based on previous literature, individuals with high levels of Machiavellianism tend to exhibit more risk-seeking behavior compared to those with lower levels (Gunnthorsdottir *et al.*, 2002). Studies, such as those conducted by Allsopp *et al.* (1991), have empirically demonstrated that individuals with high Machiavellianism are more inclined to take risks compared to those with lower levels, who are known for being more risk-averse.

Individuals who score low on the Mach IV scale show prosocial, cooperative, altruistic, and trusting characteristics. They lack the intention to manipulate others or situations in their favour and tend to avoid conflict. According to Christie and Geis (1970a), the attitudes of low Machs may inadvertently empower exploiters, such as high Machs, to achieve their goals at the expense of those with lower Mach scores.

The various facets of Machiavellian behavior, including persuasion, dominance, and power as studied by Rauthmann (2012) and Rauthmann and Will (2011), are particularly important for our study. Social pressure affects individuals with low Machiavellianism more than those with high Machiavellianism (Christie and Geis, 1970a), making individuals with low Machiavellianism more vulnerable in face-to-face confrontations with those who have high Machiavellianism.

Despite the wealth of studies on Machiavellian behavior, there is a notable dearth of research comparing high- and low-Mach behavior during group interactions, both within and between groups. Additionally, existing research has not adequately addressed what occurs in face-to-face confrontations when a high Mach individual is paired with a low Mach individual and they are not in direct competition, as seen in the \$10 Trust Game used by Gunnthorsdottir *et al.* (2002).

Based on the conclusions drawn so far, this behavior is considered a consistent motivational orientation, where the implicit desire to manipulate is understood. However, Machiavellian behavior is not necessarily the ability to effectively exercise manipulative tactics, as asserted by Jones and Paulhus (2009). Similar views are shared by Austin *et al.* (2007), who concluded that Machiavellians are motivated to manipulate.

In line with an earlier research conducted by Dugatkin and Wilson (1991), a stable mix of cooperators and defectors is upheld by frequency-dependent forces. Their models indicate the potential for the coexistence of high-Machs and low-Machs within human populations, although the exact timing remains somewhat uncertain. From the standpoint of high Machs, such cooperation may be perceived as advantageous (e.g., for exploitation) until low Machs (i.e., the exploited individuals) are able to identify the exploiter and make the decision to retaliate or withdraw from the cooperation. These findings suggest that high Machs are likely to have shorter relationships compared to low Machs.

The dynamics of Machiavellianism in group situations is expected to be more complex than they appear at first glance. This is because individuals with high Machiavellianism (Machs) aim to outperform others, while those with low Machiavellianism are more cooperative. Therefore, when a low Mach and a high Mach are paired in a group, the dynamics depends on the balance between individual interests and shared goals as well as coordinated action. For example, the empirical study conducted by Fry (1985) compared groups consisting of one high Mach and one low Mach individual to groups composed solely of high Machs or low Machs. The study found that groups with a mix of low and high Mach individuals were less capable of reaching a mutually beneficial solution. Consequently, individuals scoring high on the Mach IV scale are less risk-averse compared to those scoring low (Christie and Geis, 1970a). Additionally, the literature suggests that respondents who agree with Machiavellian statements are more likely to be less risk-averse than those who do not agree with such statements.

Research into risk attitudes in both individuals and groups has been considered of great importance and extensively examined in previous studies, beginning with Stoner (1961). The following paper explores the differences in risk attitudes between individuals and groups, as well as how group decisions influence the subsequent choices of individuals. It has been observed that individuals tend to align their choices with prior group decisions (Masclat *et al.*, 2009; Baker *et al.*, 2008; Shupp and Williams, 2008; Brown, 1974; Burnstein *et al.*, 1973).

The empirical studies conducted by Sutter (2009), Charness and Jackson (2009), Charness *et al.* (2009), and Chen and Li (2009) have documented that individuals' decisions are influenced by whether the consequences apply only to them or to the entire group they belong to. As previously mentioned, individuals' decisions, particularly those related to the investment process, are influenced by a complex combination of factors such as age, gender, income, and level of education, as documented by empirical studies conducted by Maxfield and Shapiro (2010) and Bali *et al.* (2009).

Previous studies, such as those conducted by Cherulnik *et al.* (1981), concluded that individuals with high Machiavellian traits are not inherently more intelligent than those with low Machiavellian traits. However, they are perceived as more intelligent by their peers. Additionally, individuals with high Machiavellian traits tend to take on central roles in small group settings and can adopt leadership roles, as documented by Bochner *et al.* (1975). These individuals can find success in competitive situations, particularly in face-to-face interactions. The authors' concluding remarks suggest that the results are highly replicable, indicating that Machiavellianism is a significant aspect of human behavior.

Furthermore, individuals scoring high on the Mach test are often indicating their readiness to employ exploitative tactics, particularly in controlled laboratory settings, as noted by Harrell (1980).

Research has also shown that Machiavellianism is somewhat linked to cultural factors, as it tends to be lower in societies that promote collectivism, such as China, as observed by Okanes and Murray (1982). In contrast, Romania, where our study is conducted with Romanian students, is not known for discouraging individualism.

Finally, according to Individual Difference Theory (Wanberg *et al.*, 2000), variations exist in the traits and behaviors of individuals (Le, 2023). While earlier studies focused on differences related to gender and race (e.g., Cain and Trauth, 2022), this theory has more recently been used to explain the impact of personality differences (Wu *et al.*, 2024). According to this theory, people's behaviors and attitudes are influenced by their personality traits (Le, 2023). This study will discuss the influence of Machiavellianism on risk attitudes in both individual and group testing based on this theoretical basis.

As such, we aimed to investigate potential differences in risk attitudes between individuals with high and low Mach scores, both at the individual and group levels. We hypothesized that the Mach IV score can effectively predict the risk attitudes (e.g., risk aversion) of both high and low Mach individuals at both the individual and group levels.

Our research hypotheses are as follows:

RH 1: The Mach score is positively correlated with how closely an individual's initial private response to risk-taking aligns with the actual group decision.

RH 2: High-mach individuals have a greater impact on group decisions.

II. METHODOLOGY

We recruited 26 undergraduate university students from the largest university in Romania. These students were enrolled in the English program with a specialization in accounting, and 7% of them were male. The experimental procedure comprised two parts: The first stage involved individual testing, while the second stage involved group testing.

Our demographic questionnaire included four sections: work experience, gender, age, and expected salary for those without work experience, or total income for those currently employed. The students underwent a series of tests, including risk attitude choice dilemmas and the Mach IV scale developed by Christie and Geis (1970a), administered at both individual and group levels. To assess risk attitude, we employed two choice dilemmas to gauge: a) the inclination to invest in bonds versus risky shares, and b) the preference for certain gains versus potential gains (e.g., risk aversion) and certain losses versus potential losses (e.g., risk propensity) as outlined by Kahneman and Tversky (1979).

In our study, we exposed our participants to various financial hazards, such as stock market investments. Our aim was to gauge their attitudes towards risk aversion and propensity, so we presented them with a choice between a risky course of action (e.g., investing in high-risk shares with an 80% chance of losing money) and a safer but less attractive alternative (e.g., investing in bonds or earning a lower but guaranteed amount). Both options were clearly outlined to highlight the potential negative consequences if the risky choice failed. To discern which option was more appealing to our respondents, we structured the choices as a simple YES/NO decision without a range scale. According to Grable and Lytton (2003), holding cash and bonds is associated with a lower risk tolerance, while investing in shares is expected to yield higher financial gains and long-term growth, albeit with higher risk (Bali *et al.*, 2009).

We utilised the Mach IV test to assess the Machiavellian predisposition. Each student individually took the test using the interactive version available at <http://openpsychometrics.org/tests/Mach-IV/>. The test comprises 20 items and evaluates three key areas: views, tactics, and morality. Its purpose is to measure a person's beliefs about the susceptibility of others to manipulation. Participants rated the 20 statements on a 5-point Likert scale ranging from (1) strongly disagree to (7) strongly agree. Raw scores fell within the range of 10 to 100, with higher

scores indicating a stronger inclination towards Machiavellianism. The students took the experiment seriously, as it was part of the course. There was no financial incentive for the students, who did not expect to be paid for attending regular classes. Our students, who were accounting students with quantitative abilities, were considered suitable for participating in the experiment.

Prior to the experiment, the observers prepared all the tests and activated the start button to prevent the respondents from reading any test details beforehand. The test duration ranged from 2 to 5 minutes. After completing the Mach IV test, all the answers were printed, and each respondent was assigned a unique number for tracking scores and pairing high and low scorers in the second stage of the experiment. Following the individual Mach IV test, each respondent received a paper with two choice dilemmas.

In the second stage, 13 two-member groups took part in both the low and high Mach conditions as follows: 5 groups consisted of only low Mach individuals, while 8 groups were made up of 1 low Mach individual and 1 high Mach individual. Subsequently, we asked the participants to collectively make decisions on the choice dilemmas they had received during individual testing. The groups were given the opportunity to discuss each item from the testing procedure until a consensus was reached.

The group was not given a specific timeline to reach a consensus, as Fraser (1971) observed that allowing more time for discussions within groups did not necessarily lead to greater shifts in opinions. The subjects were not informed about how the groups were formed. We used the same students for both testing and retesting to evaluate the reliability of our research instrument.

III. RESULTS AND DISCUSSIONS

Following the obtained results, groups consisting of one low Mach and one high Mach respondent showed a significant consensus towards higher risk-seeking behavior when the high Mach respondent displayed more risk propensity in private testing. When groups were formed by two low Mach respondents, the group displayed a risk attitude similar to individual testing. Overall, when aligning individual answers with group decisions, the results revealed that most low Mach respondents changed their attitudes towards risk when paired with high Mach respondents. Conversely, most low Mach groups did not change their attitudes towards risk aversion, indicating that Machiavellian predisposition can impact risk propensity attitudes and be an important determinant of choice behavior. In order to investigate the impact of High Mach versus Low Mach individuals on group decision-making, we outlined our sample as shown below. Table 1 provides a description of the sample for this study.

Table 1. Sample description

	Number of responses
Questionnaire sent out	47
Answers received (individual and group)	39
Response rate (%)	82.98
of which group level answers:	13
- groups with identical Mach level students	5
- Incomplete answers	0
Valid (complete) answers	8
Valid answers rate (%)	61.54

Source: Authors` own calculations

As shown in Table 1, we narrowed down our sample to include 'group observations', with each group consisting of a High Mach member (Member 1) and a Low Mach member (Member 2). This approach allows us to differentiate the impact on group decision-making (represented by the variable 'Group_Score') of High Mach members (Member1_Score) from that of Low Mach members (Member2_Score).

Table 2 reports the descriptive statistics for our sample as following:

Table 2. Descriptive statistics

	Mean	Std. Deviation	N
Group_Score	66,25	14,626	8
Member1_Score	73,63	11,722	8
Member2_Score	40,63	6,391	8

Source: Authors` own calculations

Based on the descriptive statistics in Table 2 above, it is evident that the mean Mach score for Member 1 (High Mach students) exceeds the group score ($73.63 > 66.25$), whereas the mean Mach score for Member 2 (Low

Mach students) falls below the group score ($40.63 < 66.25$). This suggests that the behavior of the group differs from that of individuals.

Based on the correlation matrix (refer to Table 3 below), it is evident that there is a strong and statistically significant correlation between the scores of Member 1 (High Mach students) and Group scores. However, the scores of Member 2 (Low Mach students) show a much weaker correlation with Group scores and are not statistically significant.

Table 3. Correlations

		Group_Score	Member1_Score	Member2_Score
Pearson Correlation	Group_Score	1,000	,809	,195
	Member1_Score	,809	1,000	,005
	Member2_Score	,195	,005	1,000
Sig. (1-tailed)	Group_Score	.	,008	,322
	Member1_Score	,008	.	,495
	Member2_Score	,322	,495	.
N	Group_Score	8	8	8
	Member1_Score	8	8	8
	Member2_Score	8	8	8

Source: Authors` own calculations

In Table 3, the data provides initial support for our hypotheses. Our empirical results align with Ghosh and Ray's (1992) findings that attitude towards risk influences decision-making. Additionally, we suggest that Mach predisposition may influence one's attitude towards risk propensity and aversion.

Our findings also align with Rim's (1966) research, indicating that individuals scoring high on the Mach IV scale have a significant impact on group dynamics. Furthermore, our results suggest that the interplay of leadership dynamics with individuals scoring low and high on the Mach IV scale can lead to a shift towards riskier decision-making. One possible explanation for our findings is that when a low-scoring Mach individual is paired with a high-scoring Mach individual in a group, the high Mach individual's propensity for risk-taking behavior influences the group, particularly when paired with a low Mach individual.

We can partly attribute our results to the fact that we permitted discussions within the groups. Teger and Pruitt (1967) found a greater tendency for risk-taking when discussions were allowed in their study. Similarly, our results provide further evidence for Brown's theory on group risk propensity.

Further, to test our hypotheses, we created a multilinear regression model with two independent variables (Member1_Score and Member2_Score), and the dependent variable being the Group_Score. Our findings are disclosed below in Tables 4 and 5 as follows:

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.831 ^a	.691	.567	9,626

Table 5. ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1034,233	2	517,116	5,581	.053 ^a
	Residual	463,267	5	92,653		
	Total	1497,500	7			

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	-25,701	32,602		-,788	,466			
	Member1_Score	1,008	,310	,808	3,247	,023	,809	,824	,808
	Member2_Score	,437	,569	,191	,767	,478	,195	,325	,191

According to Table 4, our model demonstrates a medium explanatory strength, explaining 56.7% of the variation in the Group_Score variable. The significance tests are presented in Table 5. Overall, our model is significant at the 0.053 level. Regarding the individual variables, Member1_Score shows a significance level of 0.023, while Member2_Score has a significance level of 0.478. This indicates that only students with high Machiavellian traits (High Mach students) have a statistically significant impact on group decision-making, as represented by the Group_Score variable

Based on our findings, we observed a statistically significant influence of Member1_Score on Group_Score, indicating a significant impact of High Mach respondents on group decisions. On the other hand, we found that Member2_Score is not statistically significant, suggesting that Low Mach students may have less influence on group decisions than their peers. Therefore, we can confirm our hypothesis that High Mach students have a greater impact on group decisions than Low Mach students.

We conducted a detailed analysis to investigate the potential factors that may influence whether a student is classified as High Mach or Low Mach. We had access to information regarding the students' age, gender, work experience, and expected wage after graduation. As the variables were measured at nominal and scale levels, we employed the Pearson Chi-Square method to assess the strength of the relationship between a student's score and their characteristics.

We investigated the influence of age on both Machiavellianism predisposition and financial risk tolerance. Previous research (Christie and Geis, 1970a) suggests that younger individuals tend to be more Machiavellian than older individuals. However, the evidence regarding the impact of age on financial risk tolerance is inconclusive. For instance, a study conducted by Grable (2000) found that risk tolerance increases with age. However, other studies, such as those conducted by Grable et al. (2004), indicate that younger respondents tend to be more risk tolerant than older respondents. Previous studies have also shown that the correlations between Mach score and behavior in subsequent tests are typically stronger or different in male participants than in female participants (Allsopp et al., 1991).

In our study, we had a higher proportion of female participants compared to male participants. According to Miesing (1985), individuals with postgraduate qualifications and work experience tend to exhibit lower levels of Machiavellian behavior compared to undergraduates and those without work experience. Our study revealed that gender was the primary factor influencing respondent behavior, with other factors showing less explanatory power from this perspective. Our findings were summarized in Table 5 above.

IV. CONCLUSION

We are revisiting the phenomenon that group decisions may differ systematically from decisions made by individuals. Our quasi-experiment examined decisions regarding risk attitudes from both individual and group perspectives using the same subjects in two stages. In this regard, our research hypotheses suggest that individuals scoring higher on the Mach IV scale exhibit an increased propensity for risk-taking. This is supported by previous studies indicating that individuals with high Mach scores are typically less risk averse.

As the influence of high Machs can override that of low Machs, we anticipated that low Machs will adjust their risk-taking behavior based on the risk propensity of high Machs when paired together. Consequently, we expected decision-making related to risk to pose a challenge for low Machs when interacting with high Machs. Our assumption was rooted in the understanding that high Machs possess the ability to manipulate others in order to achieve their objectives.

We were interested in exploring whether individuals with high Machiavellian traits have a propensity to manipulate the decisions of others when not under duress to do so for immediate personal gain. It is conceivable that they may seek to influence others for leadership purposes, particularly when interacting with individuals who exhibit low Machiavellian traits (e.g., those with less inclination toward leadership, assertiveness, dominance, etc.).

We conducted a questionnaire-based study to test our research hypotheses, which were derived from existing literature. Our findings provided empirical support for our hypotheses. Our research shows that personality traits, such as a Machiavellian predisposition, can influence an individual's attitude towards risk. Additionally, our empirical results highlight that group behavior differs from that of individuals when it comes to risk attitudes, similar to Stoner's (1961) findings regarding groups' preference for more risk compared to individuals. We provide empirical evidence that the Mach-IV scale can be a useful tool in predicting risk attitudes and can be an important factor in determining choice behavior.

Considering that this area of research originated from purely empirical observation without being based on a theoretical framework, there are still many avenues to be explored in the coming years. One of the primary research directions could be to find a meaningful answer to why such individual differences exist in terms of Machiavellianism. Our study is centered around pure empirical observation aimed at assessing the existence of individual differences in Machiavellianism, particularly between individuals with high and low Mach scores, and how these differences manifest in behavior. Despite recent prolific research in this area, there remains a scarcity

of fundamental research on Machiavellianism. For instance, the predictability of long-term interactions between individuals with high and low Mach scores is lacking, as most studies, including ours, have focused exclusively on short-term interactions. It's crucial to evaluate predictability in real-world settings, both in the short and long term, especially considering that previous research has predominantly been conducted in laboratory environments.

It will be the responsibility of future research to delve into the reasons why individuals transition from non-manipulative behavior to manipulative behavior at the individual, intra-group, or inter-group levels. In terms of research methodology, future studies could consider utilizing a continuous response scale to mitigate the limitations associated with the Likert scale. Our initial study has uncovered promising paths for future research in terms of identifying additional factors that influence attitudes toward risk propensity, given their significance in real-life decision-making.

Considering the absence of a conceptual framework to guide empirical research on Machiavellianism, our study may be influenced by the resulting limitations. Nevertheless, it is imperative to continue exploring this topic due to the crucial interaction between exploitative and cooperative behaviors in the business world. Additionally, criticism has been directed towards the Mach test for combining potentially independent factors (Allsopp et al., 1991). Furthermore, the reliability of studies assessing Machiavellian behavior in real-world scenarios, often conducted in laboratory settings, has been called into question. The use of a small sample size is also a notable limitation of our study. Lastly, the lack of a time limit for group discussions may have allowed for an imbalance in representing the views of low Machs and high Machs, potentially granting the latter an opportunity to assume leadership and influence the group decision. In view of these constraints, it is important to interpret our results with caution.

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