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Personality and the Influence of Positive and Negative Feedback on Self-Handicapping

Personlighet och Påverkan av Positiv och Negativ Feedback på Själv-Handikappande

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Abstract

Self-handicapping is a poorly understood defense strategy that plausibly undermines a person's chance of success. The present study examines relations between self-handicapping and the HEXACO-personality traits; namely, Honesty-Humility, Emotionality, Xtraversion, Agreeableness, Conscientiousness, and Openness. An aim is to shed new light on why some people are more prone to debilitating self-handicapping behaviors than others. Twenty-four participants completed the HEXACO-personality inventory and five arithmetic tests varying in difficulty with pseudo-randomized (false) feedback given to each participant after each arithmetic test. Self-handicapping was operationalized as participants' choice to rest, instead of practice, between each test. The data were analyzed using binomial logistic regression which revealed significant associations for Conscientiousness, Agreeableness, Openness, and Emotionality as predictors of practice. The overall model for all 6 traits displayed reasonable predictive ability, where high scorers on Emotionality, Conscientiousness and Openness were less likely to self-handicap, while high scorers of Agreeableness were more likely to self-handicap. A closer examination of the significant traits was conducted at the facet level. Results partly align with previous research, but further research is recommended on the subject. Limitations, conclusions, and further research are discussed for potential implementation.

Keywords: Self-handicapping, Personality, HEXACO, Feedback, Conscientiousness, Emotionality, Honesty-Humility.

Sammanfattning

Självhandikappning är en försvarsstrategi som är relativt outforskad och sannolikt underminerar en persons möjlighet att lyckas. Den aktuella studien undersöker samband mellan självhandikappning och HEXACO-personlighetsdragen; Honesty-Humility, Emotionality, Xtraversion, Agreeableness, Conscientiousness, och Openness. Ett mål med studien var att belysa varför vissa personer är mer benägna än andra att utföra försvagande självhandikappande beteenden. Tjugofyra deltagare utförde HEXACO-personlighetsmätningen och fem aritmetik-tester i varierande svårighetsgrad. Pseudo-randomiserad (falsk) feedback gavs till varje deltagare efter varje test. Självhandikappande operationaliserades som deltagarnas val att vila, istället för att öva mellan varje test. Datan analyserades genom en binomial logistisk regression där Conscientiousness, Agreeableness, Openness och Emotionality visade signifikanta associationer som prediktorer för övning. Den övergripande modellen för alla sex personlighetsdragen visade en rimlig prediktiv förmåga, där höga nivåer av Emotionality, Conscientiousness, och Openness visade lägre risk för self-handicapping, medan höga nivåer av Agreeableness visade ökad risk för self-handicapping. En närmare undersökning på de signifikanta personlighetsdragen utfördes på facett-nivå. Resultaten ligger delvis i linje med tidigare forskning men mer forskning kring ämnet rekommenderas. Begränsningar, slutsatser och framtida forskning diskuteras för potentiella implikationer från resultaten.

Nyckelord: Självhandikappning, Personlighet, HEXACO, Feedback, Conscientiousness, Emotionality, Honesty-Humility.

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Personality and the Influence of Positive and Negative Feedback on Self-Handicapping

Many things can hinder success, but sometimes it is one's own behavior that impedes success. A theory about self-destructive behaviors was first proposed by Sigmund Freud in his 1920 paper *Beyond the Pleasure Principle*. In this paper, Freud discusses the intentional behaviors of doing something unpleasant, which is the cornerstone of modern self-destructive behavior theory.

Attribution theory

Attribution theory is another theory relevant for the present study and was first developed by Fritz Heider in the 1958 book *The Psychology of Interpersonal Relations*. The theory was further developed by Jones & Davis (1965) and Kelley (1967), among others. The theory discusses everyday actions or behaviors in both personal and social situations, considering the how and why said action or behavior was performed.

Modern Self-destructive behavior theory

Roy Baumeister and Steven Scher further developed the theory proposed by Freud (1920) and proposed three different types of self-destructive behaviors: *primary self-destruction, tradeoff and counterproductive strategies* (1988). The primary self-destruction is a type of behavior that is knowingly and intentionally self-destructive, with the person choosing to harm themselves through the behaviors (Baumeister & Scher, 1988). The opposite of this, yet destructive, is the counterproductive strategies. This type of self-destructive behavior is neither expected nor desired. However, because of the continuous usage of strategies or behaviors that hinders one's path to success, even if the goal is to succeed, those behaviors still classify as self-destructive (Baumeister & Scher, 1988). The "tradeoff" type of behavior is somewhere in between the two previously mentioned behaviors, with it being signified by the occurrence of a tradeoff between positive and negative consequences (Baumeister & Scher, 1988). In relation to the present study, Baumeister and Scher raise the notion of self-handicapping behaviors that emerge as a "tradeoff" type of self-destructive behavior. When discussing this in the case of self-handicapping, a person's chance to succeed is hindered by the self-handicapping behaviors, however the tradeoff leads to the person getting "attributional benefits". This

means that the hindrance of success is attributed to the behavior or obstacle, rather than one's competence (Baumeister & Scher, 1988).

Self-handicapping

Self-handicapping behaviors are defined as strategies or patterns of behavior used by an individual to induce or create obstacles that inhibit one's success. The obstacles are created proactively and serve the function of excusing or externalizing one's misfortunes rather than internalizing them, in other words attributing failure to one's ability or competence, effectively protecting one's self-esteem.

Self-handicapping can be explained through the scope of attribution theory, where an individual may use forms of attribution to safeguard their self-image from instances that may reduce their own conceptions of themselves as intelligent or competent (Jones & Berglas, 1978).

Research (Jones & Berglas, 1978) suggests that augmenting or withdrawing effort through different means, such as engaging in strategic alcohol consumption, can be explained as an individual attempting to regain control of their self-attributions and self-concept (Jones & Berglas, 1978). By engaging in self-handicapping, an individual can successfully avoid internalizing the reasons for potential failure and challenging their present self-image, which consolidates the crisis. Accordingly, the negative outcome can then be ascribed to external factors, which can serve as an explanation for the self-handicapper, rather than being forced to contend with the crisis of a self-image that does not align with one's real performance, giving a sense of control. In alignment with this notion, Jones and Berglas (1978) theory about self-handicapping behaviors also suggests that an individual may not wish to be fully perceptive of themselves and their potential. Jones and Berglas (1978) posits that this is an individual's attempt to provide space for sustaining one's self-image. Pragmatically, one might avoid situations that threaten to contradict the perceived self.

Expanding on the hypothesis that an individual may "use" attribution in an attempt to protect one's self-image, it is further stated that engaging in behaviors that worsen one's chances may also be used to enhance one's triumphs despite lower expectations. One could therefore self-impose obstacles by creating or finding ones that will negatively impact good performance, effectively increasing the perception of one's sense of self-competence if success is still accomplished (Jones & Berglas, 1978). At its core, the strategy of self-handicapping facilitates a guaranteed "win" for the self-handicapper. Some forms of the

strategy in use can be exemplified in a multitude of ways: a student intentionally not getting enough sleep the night before their exams, an athlete not showing up to practice ahead of a game, or someone holding a lecture making sure they “forget” their notes.

HEXACO-PI-R

The HEXACO Personality Inventory-Revised is a personality assessment tool in the form of a questionnaire that utilizes the HEXACO model of personality structure to examine six personality traits. The dimensions of the HEXACO-framework are: Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O).

People who receive a high score on Honesty-Humility avoid manipulation for personal gain, feel no special entitlement to elevated social status, and feel little temptation to break rules (Lee & Ashton, n.d). High scorers on the Emotionality scale experience fear, anxiety, and require higher emotional support to a higher degree than low scorers during hardships. High scorers of Extraversion are described as enjoying others' company and being enthusiastic and energetic, as well as feeling positively about themselves. Scoring high in Agreeableness (versus Anger) is described as being more lenient in judging others, more willing to compromise and cooperate, and being more in control of one's temper. Highly conscientious people are good at organizing their time and work, tend to be disciplined, and strive for perfection. Persons who score high on Openness (to experience) are often absorbed in the beauty of art and nature, find interest in abstract and many domains of knowledge, and use their imagination freely. Comprehensive scale descriptions for domain-level scales as well as facet-level scales are available at < <https://hexaco.org/> > (Lee & Ashton, n.d).

The HEXACO model proposes six different personality traits or domains. Still, the basis for the HEXACO model is similar to the Five-Factor Model (FFM), which employs a lexical procedure for analyzing and structuring personalities into traits and facets (Lee & Ashton, 2016). The lexical approach in personality psychology involves compiling large lists of descriptive words and adjectives for words related to personality in different languages in a taxonomy (Ashton & Lee, 2005; John et al., 1988; Ashton & Lee, 2005). By way of factor analysis, both self and observer ratings are used to identify six dimensions of personality that explain a large amount of the covariation between the established lists (Lee & Ashton, 2016).

An expected advantage of using the HEXACO-structure over other established personality measures such as the FFM, is that the HEXACO has been shown to garner

meaningful inter-individual differences that other measures do not capture (Lee & Ashton, 2013). Additionally, with the HEXACO-structure being built around the lexical approach, an advantage is replicability across languages and cultures (Lee & Ashton, 2016). This is favored by the present study as it adheres to replicability despite participants' potential cultural or language differences, which could otherwise introduce unexpected variance. Consequently, the HEXACO-100 is suitable for broad application where language barriers and cultural differences may otherwise hinder valid assessment of personality traits. Closer examination of the HEXACO-100 yielded good levels for Cronbach's alpha for the factor-level scales with all six dimensions displaying values of .81 to .89 in both self- and observer reports (Lee & Ashton, 2016).

Some empirical findings using the HEXACO-100 include relations between the dimensions of the HEXACO-framework and academic aptitude, guilt, shame proneness, and risktaking (Lee & Ashton, 2016). The HEXACO-framework can therefore be assumed to be an appropriate approach for investigating closely related, and multifaceted phenomena, such as self-handicapping.

Relations between self-handicapping and personality

Prior research has shown relations between the Five Factor Model's traits of Neuroticism and Conscientiousness to self-handicapping behaviors, where higher levels of neuroticism and lower levels of conscientiousness increase risk of engaging in self-handicapping (Ross et al., 2002; Bobo et al., 2013; Nosenko et al., 2016). For example, findings regarding concepts closely related to self-handicapping behaviors have been found to be predicted to some degree by personality traits. Some of these related concepts include Counterproductive Academic Behavior (CAB), anxiety, and self-esteem (Ock et al., 2023; Schwinger et al., 2021). Further, CAB, anxiety, as well as self-esteem have also previously been linked to self-handicapping behaviors (Tice & Baumeister, 1990; Prapavessis & Grove, 1998; Schwinger et al., 2021; Ryska et al., 1998), implying that personality traits have some aptitude in regards to predicting self-handicapping.

Most previous research regarding self-handicapping behaviors has used the Five-Factor Model structure to examine the relationship between personality traits and self-handicapping. The present work employs the HEXACO-structure of personality, which has been shown to have high convergent validity to the Five Factor Model (Lee & Ashton,

2013). By using the HEXACO-100 the present study aims to shed new light on relations between personality and self-handicapping, beyond the standard five factor model.

Present study

The purpose of the present study is to determine which personality traits are most predictive of self-handicapping behaviors.

Determining those personality traits that underlie self-handicapping will increase current understanding of why some people self-handicap more than others. This can contribute to the development of diagnostic procedures and realistic rehabilitation strategies to help those suffering with debilitating self-handicapping disorders.

The HEXACO-PI-R personality test was selected for use in the present study because it includes the "Honesty-Humility" personality trait, which other personality scales, like the IPIP-NEO-60 (Maples-Keller, et al., 2017), do not. Relations between 'Honesty-Humility' and self-handicapping have yet to be determined but the trait, plausibly, has some relation to self-handicapping. Even with the addition of the "Honesty-Humility" trait, the HEXACO-PI-R has strong convergent validity to similar personality tests, like the NEO-PI-R (Gaughan et al., 2012), hopes to provide new convergent evidence about relations between personality and self-handicapping behaviors.

The experimental design for the present study is vaguely based on the design used in the study called *Self-Esteem Dynamics Regulate the Effects of Feedback on Ambition* by Maarit Johnson and Geoffrey R Patching (2013). The current study's design uses positive or negative feedback, similarly to the previously mentioned study. The participants receiving positive or negative feedback was something that was hypothesised to have an effect on the tendencies to self-handicap. The experimental design aims to evoke self-handicapping through arithmetic tests and the main goal of the experimental design is to find possible relationships between self-handicapping and the participant's personality traits. The current study will also reveal the effects of positive and negative feedback on self-handicapping with the intent of determining whether positive feedback can be used as a part of an intervention plan to decrease self-handicapping behaviours, beneficial for improving individuals' long-term well-being.

With these purposes in mind, the specific research questions are as follows:

- *What personality traits are related to self-handicapping behaviors?*

- *Is the Honesty-Humility personality trait a good predictor of self-handicapping?*
- *How will the tendency to self-handicap vary after receiving positive or negative feedback?*
- *Will the varying difficulty of the math tests be a contributing factor for self-handicapping?*

Method

Participants

Twenty-four people were recruited to take part in the study, mostly by way of convenience sampling on Lund University campus. No information regarding participants' age or gender was collected. All participants were informed of the experimental procedure and their right to withdraw from the study at any time without consequence. All participants took part in the study freely without monetary compensation, and provided signed consent before engaging in the study. According to the Swedish Ethical Review Authority and the guidelines of Lund University where the study was conducted, formal ethical approval was not required. The study did not involve any sensitive questions or any invasive or potentially dangerous methods, and all data was irreversibly anonymized for storage.

Material

The HEXACO-PI-R 100 items test was used (Lee & Ashton, 2018) to assess the following six personality traits: Honesty-Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O). The test was conducted and scored on the official website for the HEXACO-PI-R test.

ChatGPT version 5.2 (OpenAI, 2024) was used to create five different math tests and four additional practice supplements. The ChatGPT prompts used to create the math tests and practice supplements are provided in the appendices A - I. The participants completed the math tests (and supplemental practice questions) using pen and paper. Participants' choice to practice for each math test, or not, was documented by the experimenter on a standard spreadsheet. The data was collected and recorded in the following way, where each

participant had 4 rows for each occasion for practice or rest. The first row corresponded to the first occasion, second row to the second occasion and so on. The variables used were Feedback, Practice, and Difficulty which were divided by columns. Additionally each personality trait and each of the including facets were recorded on each of the columns given to the participant, and were repeated across all 4 rows. Statistical analysis of the data was conducted using Jamovi Solid, version 2.7.30 (The jamovi project, 2025).

Design

The study comprised two parts, which each participant completed in the same order. First participants completed the HEXACO-PI-R personality test, following the procedures detailed on the HEXACO-PI-R website. Then all participants completed the five math tests with the option of practicing between.

The five math tests were constructed to be of increasing difficulty and numbered 1 (easiest) to 5 (hardest). All participants completed the math tests in the same following order $3 \rightarrow 5 \rightarrow 1 \rightarrow 4 \rightarrow 2$. This order was chosen based on the notion that a larger difference in test difficulty would most likely lead to a change in a participant's inclination to practice for the next math test.

Participants were (falsely) informed about their performance after each math test in terms of whether they performed above or below the average. The feedback given to the participants before their decision to practice for the next math test was pseudo-randomized using all possible orders calculated as 4 factorial, for the four different feedbacks given. Generation of the feedback order was conducted through giving each feedback occasion a number from 1 through 4 to make sure all possible orders were accounted for. Each number corresponded to either positive or negative feedback, where numbers 1 and 3 equal negative feedback, as well as numbers 2 and 4 equalling positive feedback. A table of all generated orders for the feedback is supplied in Appendix J and was used in chronological order during the experiment. The reason for using the numbers 1 through 4 despite only having two levels of feedback was to make sure all orders were taken into account. This resulted in 24 different orders of feedback to be used in the present experimental design. This factorial counterbalancing was done to avoid order effects and most importantly ensure that each participant received positive feedback twice and negative feedback twice. Prior to the experimental study proper, three pilot studies were conducted to assess and precisely tune all aspects of the study design.

Procedure

After providing written consents all participants were directed to the HEXACO-PI-R website. Participants were requested to follow the instructions on the website to complete the HEXACO personality test using a computer provided by the experimenter. On completion of the HEXACO personality test, each participant was told that the next (math test) stage of the study would follow and their personality assessment would be thoroughly explained after completion of the math tests.

Instructions for Stage 2 of the study followed the personality test, when all participants were given the opportunity to take a short break to ask questions or rest before proceeding with the math tests. Each participant was given 1 minute to answer as many questions as possible on each math test. After completion of each math test, the test was handed back to the experimenter who gave the impression of grading the test. After the test was “corrected” each participant received their predesignated (false) feedback about whether their test score was above or below average. Participants then received information regarding the difficulty of the next math test in relation to the math test they had just taken. On provision of both feedback and test difficulty each participant was given the chance to practice for the next test for 1 minute, or rest for 1 minute. During Stage 2 of the study, each participant was given a total of four opportunities to practice or rest. On average, it took participants around 35 minutes to complete both parts of the study. Once completed, a debriefing session was held during which it was revealed to the participants that the feedback given was completely randomized and not accurate to performance. Furthermore, all participants’ were told that they performed well regardless of the feedback given, and that the experimenters did not actually score each test or save any data regarding their answers. This was done to adhere to ethical guidelines. No negative or suspecting harmful reactions to the negative feedback were given by the participants during or after the experiments. Further, some of the facets and traits in the personality assessment were examined and explained to each participant, giving the participants time to ask questions about and study their own results from the personality test.

Data Analysis

The present study employed a repeated measures design, and generalized multilevel modeling is most usually recommended to analyze such designs (Nezlek & Mroziński, 2020).

In the present case, however, the generalized multilevel model failed to converge and so standard binomial logistic regression was chosen with little detriment to inferential power.

The data analysis is conducted in three parts: 1) analysis of the descriptive statistics, 2) omnibus binomial logistic regression in which all variables were entered into the regression equation, 3) binomial logistic regression of the facets of each personality trait that were found to be statistically significant predictors of practice in the omnibus analysis.

The descriptive statistics show scores for the six personality traits. With the Mean, Minimum, and Maximum values being above five, even though the HEXACO test uses a five-point Likert scale. This is because the raw data is transformed into a standardized score, yielding mean and maximum scores higher than five.

An omnibus binomial logistic regression analysis was performed to analyze the collected data as the outcome was a binary variable. During the analysis it was found that four out of the six HEXACO personality traits are statistically significant predictors of practice, namely; Emotionality, Agreeableness, Conscientiousness and Openness.

Further logistic regressions were performed on a facet-level for the four significant traits. This closer look at each trait's facets gave more nuance to what aspect of the personality trait that actually had some relation to self-handicapping. The facets that showed a significant relation was Diligence from Conscientiousness, Dependence and Sentimentality from Emotionality, and Gentleness from Agreeableness.

Results

Descriptives

Table 1 details the descriptive statistics for each of the HEXACO traits.

Table 1

Descriptives of the HEXACO traits

Variable	Honesty Humility	Emotionality	Xtraversion	Agreeable	Conscient	Openness
N	24	24	24	24	24	24
Mean	5.96	5.46	5.32	5.48	5.36	5.43
Median	6.10	5.32	5.30	5.66	5.29	5.54
SD	0.917	1.16	0.927	1.11	1.14	0.827
Minimum	2.97	3.56	2.75	3.01	3.18	3.86
Maximum	7.32	7.20	6.99	7.78	6.97	6.71

Model Fit Measures

A binomial logistic regression was used to examine the effects of the HEXACO-personality traits, feedback, and difficulty, on the probability of self-handicapping tendencies through practice, (0 = no practice, 1 = practice). The overall model produced a statistically significant model fit, $\chi^2(8) = 38.6, p < .001$, indicating the predictor's ability to distinguish between practice and no practice. The model explained a reasonably large proportion of variance (Nagelkerke's $R^2 = .445$) and showed adequate model fit (Deviance = 92.4, AIC = 110).

Table 2

Overall Model Test using all HEXACO traits

Model	Deviance	AIC	R^2_N	χ^2	df	p
1	92.4	110	0.445	38.6	8	<.001

Note. R^2_N is Nagelkerkes pseudo R^2 .

Model Coefficients - Practice

Individually, Emotionality (OR = 2.26, 95% CI [1.32, 3.86], $p = .003$), Conscientiousness (OR = 2.03, 95% CI [1.08, 3.81], $p = .028$), and Openness (OR = 2.60, 95% CI [1.25, 5.43], $p = .010$) showed positively significant associations to practice, meanwhile Agreeableness (OR = 0.49, 95% CI [0.27, 0.89], $p = .018$) showed a negative association. Feedback, Difficulty, Xtraversion, and Honesty-Humility, were not statistically significant predictors of practice (all $ps > .05$).

Table 3
Model Coefficients for the Omnibus Model

Predictor	Estimate	SE	Z	p	Odds ratio	95% Confidence Interval	
						Lower	Upper
Intercept	-3.955	3.407	-1.161	.246	0.0192	2.41e-5	15.202
Feedback:							
1 – 0	-0.353	0.515	-0.685	.493	0.7028	0.256	1.928
Difficulty:							
Easier – Harder	-0.891	0.522	-1.70 6	.088	0.4101	0.147	1.142
Honesty -Humility	-0.405	0.331	-1.226	.220	0.6668	0.349	1.275
Emotionality	0.814	0.273	2.977	.003	2.2568	1.321	3.856
Xtraversion	-0.395	0.316	-1.248	.212	0.6739	0.363	1.252
Agreeableness	-0.713	0.301	-2.367	.018	0.4904	0.272	0.885
Conscientious	0.708	0.322	2.202	.028	2.0298	1.081	3.812
Openness	0.958	0.374	2.560	.010	2.6070	1.252	5.429

Note. Estimates represent the log odds of "Practice = 1" vs. "Practice = 0".

Facets - Emotionality

When looking at the model coefficients individually, Dependence (OR = .50, 95% CI [.27, .92], $p = .026$) showed significant negative associations to practice = 1, while Sentimentality (OR = 3.49, 95% CI [1.64, 7.45], $p = .001$) showed significant positive results.

Table 4

Model Coefficients for facets of Emotionality

Predictor	Estimate	SE	Z	p	Odds ratio	95% Confidence Interval	
						Lower	Upper
Intercept	-6.258	1.951	-3.208	0.001	0.00191	4.18e-5	0.0876
Fearfulness	0.392	0.278	1.412	0.158	1.47985	0.859	2.5497
Anxiety	0.282	0.271	1.039	0.299	1.32520	0.779	2.2538
Dependence	-0.700	0.314	-2.226	0.026	0.49672	0.268	0.9198
Sentimentality	1.251	0.386	3.237	0.001	3.49302	1.638	7.4483

Note. Estimates represent the log odds of "Practice = 1" vs. "Practice = 0"

Facets - Conscientiousness

One significant coefficient was identified in the Conscientiousness facets, Diligence (OR = 2.41, 95% CI [1.21, 4.82], $p = .013$). Feedback, Difficulty, Organization, Perfectionism, and Prudence, all showed non significant results as predictors (all $ps > .05$).

Table 5*Model Coefficients for facets of Conscientiousness*

Predictor	Estimate	SE	Z	p	Odds ratio	95% Confidence Interval	
						Lower	Upper
Intercept	-5.1469	1.886	-2.729	.006	0.00582	1.44e-4	0.234
Organization	0.1901	0.302	0.629	.529	1.20943	0.669	2.187
Diligence	0.8799	0.354	2.487	.013	2.41069	1.205	4.822
Perfectionism	-0.1296	0.361	-0.359	.720	0.87845	0.433	1.782
Prudence	0.0733	0.244	0.301	.764	1.07605	0.667	1.736

Note. Estimates represent the log odds of "Practice = 1" vs. "Practice = 0"

Facets - Agreeableness

The model coefficients resulted in one significant predictor; Gentleness (OR = .37, CI [.19, .75], $p = .006$). Feedback, Difficulty, Forgiveness, Flexibility, and Patience gave non significant results (all $ps > 0.5$).

Table 6*Model Coefficients for the facets of Agreeableness*

Predictor	Estimate	SE	Z	p	Odds ratio	95% Confidence Interval	
						Lower	Upper
Intercept	3.869	1.832	2.112	0.035	47.874	1.322	1734.170
Forgiveness	-0.187	0.254	-0.735	0.462	0.829	0.504	1.366
Gentleness	-0.988	0.357	-2.772	0.006	0.372	0.185	0.749
Flexibility	0.198	0.332	0.595	0.552	1.219	0.635	2.337
Patience	0.301	0.317	0.952	0.341	1.352	0.727	2.515

Note. Estimates represent the log odds of "Practice = 1" vs. "Practice = 0"

Discussion

As results from the overall model fit measures produce a significant p -value, it is safe to assume that the model performed significantly better than a null model. This indicates that at least one of the HEXACO-personality traits used as variables improved the model's predictive power. Also importantly, the model provided a Nagelkerke's R^2 of .445, meaning the models independent variables had a substantial explanatory power of the variance for practice. However, with Nagelkerke's R^2 being a pseudo- R^2 measure, there is more nuance to the exploratory power of the variance, and a simple statement like "the model explains around 45% of the variance" can not be made.

When analyzing the six HEXACO personality traits through the binomial logistic regression and studying the model coefficients, it was found that four out of the six had some kind of relation with self-handicapping behaviors. These four were Emotionality, Agreeableness, Conscientiousness and Openness. All these four had a significant p -value which means it can be concluded that the relationship between these traits and the self-handicapping behavior is unlikely to have been obtained by chance.

Previous research on the subject, as discussed in the introduction, has similarly found relations between Emotionality or Neuroticism and Conscientiousness to self-handicapping behaviors (Ross et al., 2002; Bobo et al., 2013; Nosenko et al., 2016). In the present study, the two previously mentioned traits gave significant odds ratios of approximately 2.25 and 2.03 respectively, meaning that a person's odds for practicing increases for each unit increase in each aforementioned trait. However, different from previous studies, which describe people with high values in Emotionality and low values in Conscientiousness to be the ones with the highest tendencies to perform self-handicapping behaviors. The present study found that only the results from Conscientiousness aligned to the previous research. The present study found a large odds ratio for Emotionality, whereas if the present results were aligned to previous research, the odds ratio for Emotionality would have been low (odds ratio < 1), meaning that participants in the present sample were more likely to practice if they scored higher on emotionality, while previous research indicates that high levels of emotionality instead indicate higher likelihood of self-handicapping.

The two other significant personality traits, Agreeableness and Openness, have not shown to have a significant relationship to self-handicapping behaviors in previously conducted studies. The odds ratio produced by the Agreeableness trait was approximately 0.49, meaning that a person with low scores of Agreeableness were significantly less likely to practice than a person with high scores. Openness produced an odds ratio of around 2.6 which is the largest odds ratio found during the analysis. This suggests that participants' with high openness are highly likely to practice, and less prone to self-handicapping. However, out of the significant predictors, Openness confidence intervals were the widest, giving less certainty about the representation of the population mean than the three other significant factors. Furthermore, there is more evidence that Openness is more nuanced, and this will be discussed further during the Facets discussion.

Honesty-Humility

The last two personality traits that were looked at, Xtraversion and Honesty-Humility did not produce significant p -values ($p > .05$). This is interesting for the present study since a research question about the Honesty-Humility traits viability as a predictor for self-handicapping behaviors. The Honesty-Humility traits insignificant p -value shows that it was not a reliable predictor. As the usage of the HEXACO-PI-R test was partially based on the goal to evaluate the Honesty-Humility trait as a predictor, and the current study providing

evidence that it is not a reliable predictor, future research with similar designs could use personality tests that does not include the trait.

Facets

Emotionality

Looking at the facets of the Emotionality variable, two of the four facets turned out to be significant ($p < .05$): Dependence and Sentimentality, where each unit increase in Dependence resulted in lesser odds of practice, and each unit increase in sentimentality yielded higher odds of practice. It being these two that was significant was surprising when comparing the given definitions on the HEXACO website and to previous research (Ross et al., 2002; Bobo et al., 2013; Nosenko et al., 2016). The probable cause of these results lie within the experimental design and the sample used. Something else found, and perhaps more interestingly, the facet of Anxiety did not produce a significant p -value ($p > .05$). This is a surprising outcome when comparing the previously mentioned definitions given to the facets and previous research. Like the previous two facets, this result might be from some flaw in design or sampling.

Conscientiousness

Taking a closer look at the facets of Conscientiousness, only the Diligence facet yielded significant results. High scores of Diligence suggest a strong work ethic and a will to exert oneself (Lee & Ashton, n.d). Meanwhile, lower scores align with the profile of the typical self-handicapper, showing low levels of self-discipline and low motivation to achieve. For each unit increase in the Diligence scale-level, the probability of practice increased significantly. Considering the definition of the Diligence facet and what it measures (Lee & Ashton, n.d), this was an expected result and seems to function and predict self-handicapping behaviors to a certain extent.

However, the results from Organization and Prudence did not show significant results, even if low levels of the provided definitions seem to relatively closely describe self-handicapping and certain related behaviors. One possible reason for these results may be the way self-handicapping behaviors were operationalized and defined throughout this study. The chosen experimental design allowed precise and accurate coding of whether self-handicapping was performed; however, it might have oversimplified a very complex behavior. High scorers of Organization prefer structured approaches to tasks and seek order,

and high scorers of Prudence tend to inhibit impulses and consider consequences, resulting in higher self-control (Lee & Ashton, n.d). It would not be unreasonable to assume that these facets play a bigger role in whether or not self-handicapping behaviors are engaged with in a more realistic and commonplace situation. For instance, in a realistic situation the balance between the expected behavior of studying and another behavior that gives instant gratification, rather than rest, is likely skewed further towards the latter. In these cases, higher levels of prudence and organization are reasonably very beneficial to minimizing risk for self-handicapping behaviors, perhaps more so than Diligence.

Agreeableness

In contrast to previous research on the relation between self-handicapping behaviors and personality, the trait Agreeableness was found to be a significant predictor. When looking at the facets of Agreeableness, only Gentleness was found to be a statistically significant predictor of practice. Participants who scored high on Gentleness, were more likely not to practice and vice versa. The HEXACO definition for Gentleness posits that high scorers show tendencies of being lenient and kind when interacting with others.

Speculatively, it is possible that a combination of the sample and social desirability could have introduced some unexpected variance which resulted in Gentleness serving as a significant predictor. For instance, high scorers of Gentleness were possibly more prone and willing to “help” and made an assumption regarding the experiment's aim, therefore acting in concordance with what they believed was desirable for the experiment, effectively introducing bias and skewing results. Conversely, low scorers of Gentleness were, therefore, likely less prone to “helping” and possibly at lower risk for introducing the social desirability bias.

Openness

When looking at the facets for the trait Openness, none of the facets gave a significant p -value nor odds ratios. This shows that on a facet-level, the Openness trait is not a good predictor of practice. These results might indicate some covariance between the personality traits. The probable existence of covariance which has led to the Openness trait being significant alters the perception of Openness viability as a good predictor of practice. The fact that the Openness trait is significant does not change, where higher levels of openness increases a person's odds of practice, but the facets indicate that there is something within the

other personality traits that makes Openness better. To know exactly what that something is, or why it happened, more research studying the HEXACO-traits would be needed.

Feedback and Difficulty

An important aspect of the design of the present study is the impact of differentiating positive and negative feedback and varying difficulty of the math tests. When studying the coefficients of the model where the Feedback and Difficulty factors were among the predictors, it showed that both of the factors lacked a significant p -value ($p > .05$).

The results produced by Feedback and Difficulty contradicts the hypothesis that these two variables would have a significant effect on the participants likelihood to perform self-handicapping behaviors. One of the reasons for this might be the sample that was used for the experiment. A majority of the participants were students who study within the social sciences, which in the case of the present studies sample generally also meant a lack of pride for their mathematics abilities. This lack of care affects the effectiveness of both the Feedback and the Difficulty variable. These two variables are implicitly dependent upon the participants' concern with their mathematical abilities.

For the present sample, something like a word-scramble test might have been more effective. However, the more effective change would be to change the sample. As the present sample's characteristics did not follow a normal distribution curve, while using a sample that did, could have an effect on the tendency to not enjoy mathematics. If mathematical ability would have had a larger part of the participants' academic self-image, perhaps the effect of the Feedback and Difficulty variables would have been larger, however this can not be said with any certainty.

One other possible explanation for why the Feedback variable did not show as significant could be for how the Feedback aspect was designed. Pseudo-randomizing and overseeing that the same amount of positive and negative feedback was administered was something that was a necessary part of the design, but it also led to situations that might have affected the variables effectiveness. With the feedback being pre-determined, it sometimes did not reflect the actual results for the math tests. This was something that was recognized as a possibility that could happen beforehand and the fact that what the feedback was based on never was explicitly stated to the participants, it could divert some suspicion. However, some of the participants might have deduced that the feedback was not an actual reflection of the results performed, and hence the Feedback variable might had lost its way to affect those

participants. Furthermore, the usage of positive and negative false feedback had both pros and cons. Like previously mentioned, using a pseudo-randomized design for the feedback, and hence giving feedback that was not based on the participants performance for the tests at hand, was a part of the design that was needed if the feedback factor was to be analyzed. However, this did lead to deception from the researchers. This goes against APA's *principle of respect for people's rights and dignity*, *principle of fidelity and responsibility* and, *principle of integrity* (Passer, 2021). In the application of the present study, deceiving the participants could lead to emotional stress, both from information being withheld and from negative feedback about one's performance. However, according to the current APA guidelines, deception can be sanctioned as long as the risk for emotional stress is not substantial (Passer, 2021). In the present study, the risk for emotional stress is arguably quite low. The negative feedback given could have led to a negative reaction, but similarly, the two occasions during each experiment that positive feedback was given to each participant, it could have led to positive reaction. Further, having a debriefing session after each experiment where everything was told and where the deception was explained to the participant, decreases the risk for substantial emotional stress following the experiment. To back up this claim, however from the small sample size of the present study, is that none of the participants showed any distress or ill-being during the experiment and none of the participants has conducted the researchers with any claims of stress following the experiment.

Social desirability bias

Something that might have affected the results in the present study is the possible existence of a social desirability bias within the used sample. Since the sample used was gathered from convenience sampling, and also the participants agreeing to be a part of the experiment without any compensation, one might be able to make the assumption that the participants want to do what they think is the most socially desirable (Bäckström & Björklund, 2014). In the case of the present studies experiment, the participants might have come to the conclusion that practicing was the thing that was expected of them when given the choice, and hence it being the most socially desirable. A social desirability bias might also be present during the personality test part of the design. This might be since some personality traits are normatively viewed as "better" than others. These claims are purely speculative and the present study does not have any proof that this might be the case. However, assuming that the claim was to be true, it might possibly be a variable that has

contributed to the fact that the present study has produced a differentiating result in comparison to previous research on the subject.

Limitations

With respect to time and resources, some methodological complications may have influenced the results. In the present study, a convenience sampling method was employed at Paradis, the school grounds for social science students in Lund. Previous research shows significant major differences in personality traits related to one's chosen major. In the case of psychology, humanities, and political science, Openness was found to have moderate to large effect sizes compared to other majors such as economics and law (Vedel, 2015). In conjunction with a relatively low sample size, major personality differences at population-level are likely amplified. This might be the basis for why Openness was a significant predictor in the present study, contrary to previous research.

Another limitation with the present study is that most previous research done on similar topics use the Five-Factor Model (FFM) or Big Five. Although the HEXACO-structure has been shown to display high convergent validity to the FFM (Lee & Ashton, 2013), problems regarding comparability between the present and precedent research may arise. Because of this, complications regarding generalisability, implications of the results, as well as conclusiveness necessitate a diligent approach.

Another limitation of the present study is the usage of a binomial logistic regression. Like previously mentioned, the present study conducted a repeated measures design. Binomial logistic regressions are not the ideal statistical analysis for these kinds of designs and this will have affected the results. With more than one result coming from each participant, the data will be more similar than if all the data came from different participants. This is called nested data (Bauer et al., 2020). This will lead to the standard error of the data being underestimated. As a product, this results in inflation of the z-values, leading to the *p*-values being smaller than they should. In turn, the data violates the assumption of independence needed for a binomial logistic regression, resulting in higher risk for type 1 errors. Furthermore, ambiguity regarding at which level each predictor applies their influence can become a problem when analyzing the data (Bauer et al., 2020). This is a continuous limitation throughout the entire data collection and analysis that likely will have affected the result of the present study.

Future Research

For future research, an interesting factor to examine in conjunction with the present aim would be gender. Previous research has found significant gender differences in the Big Five traits Agreeableness, Conscientiousness, as well as Neuroticism, where males score significantly lower on all three traits (Vedel et al., 2015; Rubinstein, G., 2004; Larson et al., 2007). As stated elsewhere, the self-handicapper tends to score lower on Conscientiousness and higher on Neuroticism. An interesting question to examine would henceforth be if significant gender differences in self-handicapping behavior can be found at a group-level, or whether Conscientiousness or Neuroticism serves as a mediating factor for the other, reducing the effect of the personality differences across genders. Additionally, a discussion between if the social desirability bias or one's personality makes the biggest difference in practicing or not practicing in this case could be had. But for that discussion to be possible, further research with some kind of social desirability variable present would need to be conducted. Moreover, for future research it could be useful to try to control the possible existence of a social desirability bias and examples of how this could be done is present in Larsson's article (2019), *Controlling Social desirability bias*. Lastly, a larger sample size in conjunction with usage of a generalized mixed model would be necessary for conclusive results.

Conclusion

Trying to draw any conclusions from the present study is not easy. Even though statistically significant results were obtained during the present study, existing nuances of the experimental design, sample, and the usage of a binomial logistic regression still makes it difficult to draw conclusions. However, one conclusion that can be made with some level of certainty is that variable Conscientiousness has some kind of relationship with self-handicapping behaviors and therefore works well as a predictor. This aligns with previous research. Conclusions about the usefulness of the Honesty-Humility variable as a predictor can be drawn and the presented results suggest it being a bad predictor for self-handicapping behaviors. The factors of Feedback and Difficulty present in the experimental design also showed no significant predictive power for the dependent variable. Emotionality having a positive odds ratio and Agreeableness and Openness being significant does not align with previous research, potentially indicating some limitations and problems with the present design. Further research into the subject is needed to try to navigate the

relationship between personality traits and self-handicapping behaviors and a further look into the design of the present study would be recommended in trying to be able to draw any further conclusions about the results.

Author Participation

All work of the thesis was conducted in conjunction with both authors, with the exception of four experiment occasions where Jack Granath conducted the experiment on his own.

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Appendices

Appendix A

TEST 1

- | | | |
|-----------------|-----------------|-----------------|
| 1. $45 + 30 =$ | 12. $75 + 20 =$ | 25. $33 - 20 =$ |
| 2. $18 + 40 =$ | 13. $31 - 20 =$ | 26. $76 + 20 =$ |
| 3. $62 - 10 =$ | 14. $67 + 10 =$ | 27. $21 - 10 =$ |
| 4. $56 + 30 =$ | 15. $84 - 10 =$ | 28. $49 + 40 =$ |
| 5. $73 - 20 =$ | 16. $53 + 40 =$ | 29. $63 - 30 =$ |
| 6. $29 + 50 =$ | 17. $26 - 10 =$ | 30. $88 + 10 =$ |
| 7. $81 - 10 =$ | 18. $71 + 20 =$ | 31. $54 - 20 =$ |
| 8. $37 + 40 =$ | 19. $39 - 30 =$ | 32. $27 + 60 =$ |
| 9. $90 - 10 =$ | 20. $44 + 30 =$ | 33. $70 - 20 =$ |
| 10. $22 + 60 =$ | 21. $68 - 20 =$ | 34. $41 + 30 =$ |
| 11. $48 - 30 =$ | 22. $15 + 70 =$ | 35. $66 - 10 =$ |
| | 23. $82 - 10 =$ | 36. $64 - 20 =$ |
| | 24. $57 + 30 =$ | |

Appendix B**Practice Sheet 5**

Practice sheet corresponding to test difficulty 5.

1. $(45 + 30) - 20 =$
2. $6 \times (7 + 4) =$
3. $(80 - 25) + 30 =$
4. $9 \times (6 - 2) =$
5. $(120 \div 4) + 35 =$
6. $56 + (40 - 20) =$
7. $8 \times (6 + 5) =$
8. $(150 - 60) + 50 =$
9. $72 \div (8 - 4) =$
10. $(39 + 50) - 30 =$
11. $7 \times (8 - 3) =$
12. $(100 \div 5) + 60 =$
13. $64 + (30 - 15) =$
14. $6 \times (9 + 3) =$
15. $(90 - 40) + 40 =$
16. $81 \div (9 - 6) =$
17. $58 + (20 - 10) =$
18. $5 \times (7 + 5) =$
19. $(140 - 70) + 40 =$
20. $72 \div (6 - 3) =$

Appendix C**TEST 2**

1. $128 + 40 =$

2. $95 - 30 =$

3. $67 + 80 =$

4. $142 - 20 =$

5. $89 + 50 =$

6. $173 - 60 =$

7. $54 + 90 =$

8. $160 - 70 =$

9. $78 + 60 =$

10. $134 - 50 =$

11. $92 + 70 =$

12. $185 - 80 =$

13. $63 + 120 =$

14. $149 - 40 =$

15. $88 + 110 =$

16. $172 - 90 =$

17. $57 + 130 =$

18. $166 - 30 =$

19. $104 + 80 =$

20. $153 - 70 =$

21. $69 + 140 =$

22. $180 - 60 =$

23. $77 + 100 =$

24. $162 - 50 =$

25. $91 + 90 =$

26. $174 - 80 =$

27. $58 + 120 =$

28. $168 - 40 =$

29. $83 + 110 =$

30. $150 - 30 =$

31. $72 + 130 =$

32. $177 - 90 =$

33. $66 + 140 =$

34. $159 - 70 =$

35. $97 + 100 =$

36. $182 - 60 =$

Appendix D

Practice Sheet 1

Practice sheet corresponding to test difficulty 1.

1. $34 + 20 =$
2. $57 + 10 =$
3. $22 + 40 =$
4. $68 + 20 =$
5. $41 + 30 =$
6. $75 + 10 =$
7. $19 + 50 =$
8. $63 + 20 =$
9. $28 + 40 =$
10. $90 + 10 =$
11. $36 + 30 =$
12. $54 + 20 =$
13. $71 + 10 =$
14. $47 + 30 =$
15. $82 + 10 =$
16. $25 + 60 =$
17. $66 + 20 =$
18. $39 + 40 =$
19. $58 + 30 =$
20. $73 + 20 =$

Appendix E**Test 3**

1. $45 + 30 - 20 =$

2. $6 \times 5 + 10 =$

3. $80 - 20 + 10 =$

4. $7 \times 4 - 10 =$

5. $100 \div 5 + 10 =$

6. $56 + 20 - 10 =$

7. $8 \times 4 + 12 =$

8. $120 - 40 + 20 =$

9. $72 \div 8 + 10 =$

10. $39 + 30 - 10 =$

11. $6 \times 6 - 12 =$

12. $90 \div 3 + 20 =$

13. $64 + 20 - 14 =$

14. $5 \times 7 + 10 =$

15. $90 - 30 + 10 =$

16. $81 \div 9 + 20 =$

17. $58 + 10 - 8 =$

18. $4 \times 8 + 12 =$

19. $140 - 60 + 10 =$

20. $60 \div 6 + 20 =$

21. $46 + 20 - 16 =$

22. $9 \times 3 + 15 =$

23. $100 \div 10 + 30 =$

24. $75 + 15 - 20 =$

25. $8 \times 5 + 10 =$

26. $130 - 50 + 10 =$

27. $80 \div 8 + 25 =$

28. $52 + 28 - 30 =$

29. $7 \times 5 + 20 =$

30. $160 - 80 + 20 =$

31. $70 \div 7 + 20 =$

32. $67 + 23 - 30 =$

33. $6 \times 7 + 20 =$

34. $90 \div 9 + 40 =$

35. $73 + 17 - 20 =$

36. $8 \times 4 + 30 =$

Appendix F**Practice Sheet 4**

Practice sheet corresponding to test difficulty 4.

1. $45 + 30 - 20 =$
2. $6 \times 5 + 15 =$
3. $80 - 25 + 20 =$
4. $9 \times 4 - 12 =$
5. $120 \div 4 + 25 =$
6. $56 + 40 - 30 =$
7. $8 \times 6 + 20 =$
8. $150 - 60 + 40 =$
9. $72 \div 8 + 30 =$
10. $39 + 50 - 25 =$
11. $7 \times 8 - 20 =$
12. $100 \div 5 + 50 =$
13. $64 + 30 - 20 =$
14. $6 \times 9 + 18 =$
15. $90 - 40 + 30 =$
16. $81 \div 9 + 45 =$
17. $58 + 20 - 15 =$
18. $5 \times 7 + 25 =$
19. $140 - 70 + 35 =$
20. $72 \div 6 + 40 =$

Appendix G**Test 4**

1. $48 + 36 - 25 =$

2. $7 \times 8 + 24 =$

3. $95 - 40 + 18 =$

4. $9 \times 6 - 15 =$

5. $125 \div 5 + 3 =$

6. $67 + 45 - 28 =$

7. $8 \times 7 + 35 =$

8. $180 - 75 + 26 =$

9. $96 \div 8 + 34 =$

10. $58 + 47 - 39 =$

11. $6 \times 9 - 18 =$

12. $144 \div 6 + 22 =$

13. $72 + 38 - 19 =$

14. $7 \times 9 + 28 =$

15. $140 - 65 + 33 =$

16. $108 \div 9 + 45 =$

17. $63 + 52 - 27 =$

18. $8 \times 6 + 44 =$

19. $160 - 80 + 36 =$

20. $84 \div 7 + 39 =$

21. $55 + 49 - 31 =$

22. $9 \times 7 + 26 =$

23. $132 \div 6 + 41 =$

24. $88 + 27 - 35 =$

25. $6 \times 8 + 52 =$

26. $170 - 90 + 48 =$

27. $112 \div 8 + 46 =$

28. $74 + 36 - 29 =$

29. $7 \times 8 + 43 =$

30. $150 - 70 + 55 =$

31. $91 \div 7 + 38 =$

32. $69 + 58 - 47 =$

33. $8 \times 9 + 34 =$

34. $126 \div 9 + 57 =$

35. $83 + 44 - 26 =$

36. $9 \times 5 + 68 =$

Appendix H

Practice Sheet 2

Practice sheet corresponding to test difficulty 2.

1. $45 + 30 =$
2. $62 - 20 =$
3. $18 + 50 =$
4. $73 - 30 =$
5. $56 + 40 =$
6. $81 - 10 =$
7. $29 + 60 =$
8. $64 - 20 =$
9. $37 + 50 =$
10. $90 - 40 =$
11. $22 + 70 =$
12. $48 - 30 =$
13. $75 + 30 =$
14. $31 - 20 =$
15. $67 + 20 =$
16. $84 - 40 =$
17. $53 + 60 =$
18. $26 - 10 =$
19. $71 + 40 =$
20. $39 - 20 =$

Appendix I**Test 5**

1. $(45 + 30) - 25 =$

2. $6 \times (7 + 5) =$

3. $(80 - 20) + 35 =$

4. $9 \times (6 - 2) =$

5. $(120 \div 4) + 28 =$

6. $56 + (40 - 15) =$

7. $8 \times (6 + 4) =$

8. $(150 - 60) + 45 =$

9. $72 \div (8 - 2) =$

10. $(39 + 50) - 34 =$

11. $7 \times (9 - 3) =$

12. $(100 \div 5) + 55 =$

13. $64 + (30 - 18) =$

14. $6 \times (8 + 5) =$

15. $(90 - 40) + 37 =$

16. $81 \div (9 - 6) =$

17. $58 + (20 - 13) =$

18. $5 \times (7 + 6) =$

19. $(140 - 70) + 48 =$

20. $72 \div (6 - 3) =$

21. $46 + (35 - 21) =$

22. $9 \times (4 + 5) =$

23. $(110 \div 10) + 60 =$

24. $75 + (25 - 30) =$

25. $8 \times (7 + 3) =$

26. $(130 - 50) + 44 =$

27. $96 \div (8 - 4) =$

28. $52 + (48 - 36) =$

29. $7 \times (6 + 8) =$

30. $(160 - 80) + 65 =$

31. $84 \div (7 - 3) =$

32. $67 + (33 - 44) =$

33. $6 \times (9 + 4) =$

34. $(180 \div 9) + 70 =$

35. $73 + (27 - 19) =$

36. $8 \times (5 + 9) =$

Appendix J

Pseudo-randomized feedback orders (4!)

Each number corresponds to a feedback occasion in which each number determines negative or positive, where 1 and 3 = negative, and 2 and 4 = positive feedback. Four numbers were used despite feedback only having two levels for ease of generation of the orders, as well as making sure all orders were generated properly.

Note: Order 1 is therefore to be interpreted as: Negative → Positive → Negative → Positive.

- 1: 1, 2, 3, 4
- 2: 1, 2, 4, 3
- 3: 1, 3, 2, 4
- 4: 1, 3, 4, 2
- 5: 1, 4, 2, 3
- 6: 1, 4, 3, 2
- 7: 2, 1, 3, 4
- 8: 2, 1, 4, 3
- 9: 2, 3, 1, 4
- 10: 2, 3, 4, 1
- 11: 2, 4, 1, 3
- 12: 2, 4, 3, 1
- 13: 3, 1, 2, 4
- 14: 3, 1, 4, 2
- 15: 3, 2, 1, 4
- 16: 3, 2, 4, 1
- 17: 3, 4, 1, 2
- 18: 3, 4, 2, 1
- 19: 4, 1, 2, 3
- 20: 4, 1, 3, 2
- 21: 4, 2, 1, 3
- 22: 4, 2, 3, 1
- 23: 4, 3, 1, 2
- 24: 4, 3, 2, 1