MASTER THESIS

The relationship between motives and selection accuracy of creative ideas, in a context of co-creating sustainable innovations

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I hope you will enjoy reading my thesis.

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Abstract

The United Nations (UN) came up with the sustainability development goals, because the world is facing a lot of problems, like global heating, which is the result of climate change, there is inequality and poverty and many more problems. Creative sustainable innovations are important in dealing with these problems. Creative ideas are ideas that are original, feasible and effective. These innovations can be generated together with consumers, which is co-creation. One of the steps in co-creation is selection. People's intrinsic and extrinsic motives influence their behaviour, and therefore also their behaviour in co-creation. Extrinsic motives are subdivided into knowledge motives, social motives and financial motives. This research aims at testing whether there is a relationship between consumer's their motives to participate in co-creation and their selection accuracy for selecting a top three most creative ideas. A survey is used in which 289 people participated. The selection accuracy score, which are used to test the relationship between the IV's and the DV's, are based on the selection scores of five experts in the field. Factor analysis extracted only two factors, which are intrinsic and extrinsic motives, and no significant results were found in the multiple regression analysis. Therefore, both intrinsic and extrinsic motives do not relate to selection accuracy of creative ideas in a context of co-creating sustainable innovations.

Key words: Co-creation, Creativity, Motives, Selection accuracy, Sustainability

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1. Introduction

Sustainability is a much-discussed topic nowadays, since the world is heating up, which is the result of climate change, there is inequality and poverty and many more problems that the world faces. Therefore, the United Nations (UN) came up with the sustainability development goals, which addresses the before mentioned topics and more, which then focusses on 'learn more and take action' regarding this (Sustainable Development Goals, UN). There are in total seventeen goals which they are trying to reach.

In order to reach these goals, people have to come up with ideas to solve the problems. These ideas can come from all different kinds of groups, like individuals, companies, governments, or NGO's (non-governmental organizations). Innovation is therefore needed, to create prosperity within all the changes we are facing (Amidon, 2007).

Resulting from this, there is an increasing interest in sustainable innovation, and sustainable development requires systematic and radical innovation (Boons et al., 2013). Sustainable innovation can be defined as "*the development of new products, processes, services and technologies that contribute to the development and well-being of human needs and institutions while respecting the worlds' natural resources and regenerative capacity*" (Tello and Yoon, 2008, p. 1).

As mentioned before, innovations can be created by different groups, innovations can also be created together with consumers. This co-creation for innovations has benefits for the consumers and for the organization, since co-creation by consumers can lead to superior and aligned products for the consumer and superior wealth and growth for the organization (Roberts, Hughes and Kertbo, 2014). The consumers value co-creation is defined as *"collaborative work between a consumer and a firm in an innovation process, whereby the consumer and the supplier engage (to varying degrees) in activity of co-ideation, co-design, co-development and co-creation of new product or services"* (Roberts et al., 2014, p. 149). Co-creation makes it possible for the organization to better understand customers and can get new ideas from the customer for design, engineering, and manufacturing (Prahalad & Ramaswamy, 2004).

Co-creation consists of the creative process of idea generation, evaluation and selection, and these steps can influence each other (Puente-Díaz, Cavazos-Arroyo & Puerta-Sierra, 2021). It is often assumed that creative idea generation leads to successful innovation, because having more creative ideas results in a high probability of selecting a very good idea (Rietzschel, Nijstad & Stroebe, 2010). Nevertheless, research did show that people are not great at idea

selection (Rietzschel et al., 2010). As such, idea generation is a part of the innovation process, and in idea generation are creative ideas necessary for innovation, but this is not enough (Nijstad and De Dreu, 2002). The best ideas must also be recognised and selected from all the generated ideas, for the actual implementation of creative ideas to be possible (Rietzschel et al., 2010). Nevertheless, as mentioned before, people are not very good at idea selection and ideal output does not always contribute much to creative idea selection (Rietzschel et al., 2010). This is why it is important to know how to make idea selection accurate, to have a higher probability of resulting in successful innovations. Accurate selection entails selecting the best ideas. The best ideas are the ones with the best quality, and the idea quality can be defined by the combination of feasibility and originality (Diehl and Stroebe, 1987), or by being unusual and useful (Rietzschel et al., 2010). Hao et al. (2016) define creativity as original, feasible and effective. Therefore, a creative idea should be original, feasible and effective. To measure whether something is the best idea, it could be compared to what experts think of these ideas and agree whether it is a creative idea. Summarizing, for sustainable innovation it is important that the selection of ideas is accurate, which entails that the most creative ideas, which is feasible, original and effective, are selected out of the pool of ideas. This research will focus on the selection phase within the co-creation process.

The co-creation experience relies much on the individuals, since each person's uniqueness effects the co-creation experience and the co-creation process (Prahalad & Ramaswamy, 2004). This entails that each customer has its own aspirations, desires, motivations, and behaviour, and co-creation helps the organization to more deeply understand this (Prahalad & Ramaswamy, 2004). Prahalad and Ramaswamy (2004) even state that an organization cannot create anything of value without the engagement of individuals. This statement seems a bit radical, but it does show their view on the importance of consumer engagement in innovations. This uniqueness of individuals among others entails that each person can have different motivations and therefore motives, which influence their opinions in the co-creation process. It is important to know which motives people can have for participating in co-creation, because individuals are important for the co-creation process, and their uniqueness is among others formed by their motives, and this uniqueness influences their contribution. It is also important to then see how this influences the value of their participation and therefore, how consumers motives influence their selection accuracy in the co-creation process.

As mentioned before, people all have a unique influence on the co-creation process, and individual differences in motivation are essential for understanding people and for predicting their behaviour (Neel et al., 2016). Therefore, it is interesting to know what motives influence

customer's accuracy when selecting creative ideas, for eventually meeting the UN's sustainability goals. Creativity is connected to intrinsic motivation (Grant and Berry, 2011). Motives can also be internalized or entirely extrinsic, and intrinsic and internalized and entirely extrinsic motives influence people's achievement and outcomes, such as curiosity, persistence, learning and performance (Uguroglu and Walberg, 1979; Deci and Ryan, 1985; Ayub, 2010; Rogstadius et al., 2011; Makki and Abid, 2017). The selection accuracy will most likely also be influenced by intrinsic motives and internalized and entirely extrinsic motives, since selection is a task in which people have to perform and performance or achievement are influenced by intrinsic, and both forms of extrinsic motivation. In order for the selection of ideas to be accurate, it is useful to understand how intrinsic and internalized and entirely extrinsic motives influence selection accuracy within the co-creation process.

Therefore, the goal of this research is to better understand how motives influence the selection accuracy of consumers for selecting creative ideas, for effectively meeting the UN's sustainability goals.

Therefore, the following research question will be investigated:

To what extent do the motives relate to selection accuracy of creative ideas in a context of co-creating sustainable innovations?

Managerial relevance

This paper will contribute knowledge about co-creation of consumers for organizations, which is highly relevant for their organization's performance, since this will help organizations in gaining knowledge about selection accuracy and which motives of consumers influence this. This is important, because they can use this information for creating better co-creation processes for sustainable innovations, which leads to better performance of the organization. The sustainable innovations will also contribute solutions and ideas for the seventeen development goals of the UN, which is important for society, since the goals focus on problems the world is facing. Therefore, it is important for everyone that these goals are achieved, and therefore, this paper is socially and managerially relevant.

Scientific relevance

This paper also has a scientific relevance, since most research has thus far focussed on the generation of ideas (like in; Diehl and Stroebe, 1987; Mullen, Johnson and Salas, 1991; Paulus and Brown, 2003). Whereas this research will focus on the selection of ideas, and how motives influence the selection accuracy of creative ideas. There are existing studies about selection

(Hemenway, 1990; Rietzschel et al., 2010; De Buisonje et al., 2017), but at this moment not much specifically about selection accuracy, and there is a gap in literature that matches selection accuracy with motivation. And specifically with intrinsic, internalized extrinsic and entirely extrinsic motives. Therefore, this will add knowledge to the already existing knowledge, which is the scientific relevance of this paper.

The research question will be discussed and answered in this paper by first looking at the theoretical framework in chapter two. After this, the methodology for this research will be presented in chapter three, with the operationalisation of the dependent and independent variables. Then the results will be explained and shown in chapter four. And lastly, the conclusion will be presented and thereafter discussed.

2. Theoretical framework

Next the theoretical framework will be presented. First co-creation and selection accuracy within co-creation will be discussed. Then the topic motives and how motives influence the selection accuracy will be discussed. Lastly, intrinsic and extrinsic motives will be discussed, and the hypothesis will be presented. This will eventually result in the conceptual framework, which is presented at the end of this chapter.

Selection accuracy of creative ideas in co-creation

Now selection accuracy of creative ideas in co-creation will be discussed. First the term co-creation will be explained and investigated and thereafter the selection accuracy within co-creation will be discussed.

Co-creation

Co-creation is, like mentioned before, a very important aspect within innovation for the organization and their customers, since it can lead to superior and aligned products for the consumer and superior wealth and growth for the organization (Roberts et al., 2014). Co-creation is a participative process in which people and organizations develop and generate meaning together (Ind and Coates, 2013). The customers value co-creation was defined as *"collaborative work between a consumer and a firm in an innovation process, whereby the consumer and the supplier engage (to varying degrees) in activity of co-ideation, co-design, co-development and co-creation of new product or services"* (Roberts et al., 2014, p. 149). This entails that the customer value co-creation consists of different steps, co-ideation, co-design, co-development, and co-creation of new product or services. This paper focusses on the co-ideation phase, which is the first step within this innovation process of new products or services, more specifically on the selection phase within this step.

Co-creation is about meaning making. Therefore, the idea of 'creation' is not only about creating things, but the interpretation and the meaning-making are also very important aspects within creation (Ind and Coates, 2013). This meaning-making is always co-created because not only the organization gives meaning to a brand, the customer does this as well as individuals are always linked through social interaction and therefore the brands meanings are also created by customers in the interaction process (Nonaka and Hirotaka, 1995). Within marketing approaches brands tend to focus only on the organization and therefore ignore the meaning

which is generated through social and communicative process (Kärreman and Rylander, 2008). Thus, it can be stated that meaning itself can be seen as dialogic (Morris, 2003).

As stated before, even though people assume that generating a lot of creative ideas will lead to successful innovation, because more creative ideas also result in a high probability of selecting a very good idea, research did show that people are not great at idea selection and ideal output does not always contribute much to creative idea selection (Rietzschel et al., 2010). Therefore, it is important to know how to make the idea selection accurate, which will then, together with accurate idea generation and accurate idea evaluation, have a higher probability of resulting in successful innovations.

The next part of this chapter will discuss what selection accuracy entails.

Selection accuracy

Next the selection accuracy of creative ideas in co-creation will be discussed.

Creative ideas, which have to be selected, can be defined by idea quality, which is defined as a combination of feasibility and originality (Diehl and Stroebe, 1987) and effectiveness (Hao et al., 2016). Originality is very important for creativity, since a creative idea should be new or unusual. The original idea should also be feasible, which entails it should be possible to actually use the idea, and it should not simply be a bizarre idea. An idea should also be effective, which entails it should be appropriate, relevant and worthwhile (Hao et al., 2016). Therefore, a good or creative idea should be highly original and highly feasible, or unusual and useful (Rietzschel et al., 2010; Grant and Berry, 2011), and effective (Hao et al., 2016).

In the research by Rietzschel et al. (2010) they mention that in previous research several things with regard to creative idea selection were found. They mention that in one research it was found that the average originality of selected ideas is higher for groups who generated the ideas as a nominal group (in which ideas are generated individually), than for groups who generated the ideas in interactive groups. Another study in this regard found that nominal groups only generate more creative ideas, but there was no difference on this subject to the quality of the selected ideas between the groups. This entails that the higher availability of creative ideas, generated by the nominal groups, did not associate with the selection of creative ideas. In the last study discussed, the researchers found that the members of the nominal groups, where in this study they could not see each other's ideas, did indeed generate more original but less feasible ideas than the interactive group. Nevertheless, this again was not the case for the originality and feasibility of the selected ideas, and therefore this was not correlated with

productivity. This study found that average quality of the selected ideas was not higher than the average quality of the generated ideas.

To know whether the selection of creative ideas is accurate, it should be compared to the opinion of an expert. When the expert in the field, which for this research is the field of sustainability and innovation (and packaging, which will be discussed later), agrees an idea is creative, which means original, feasible, and effective, the selected idea is accurate.

The above-mentioned studies have not yet resulted in better idea selection, besides good idea generation. This study will investigate how motives of consumers can influence the selection accuracy, which will be further discussed in the next part of this chapter.

Motives

Like mentioned before, people all have a unique influence on the co-creation process, since each customer has its own aspirations, desires, motivations, and behaviour (Prahalad & Ramaswamy, 2004). What motives are and how they can influence the selection accuracy will be discussed next.

Motivation is seen as an important component which explains how people are different from each other and similar to each other, at the same time (Neel et al., 2016). For a long time, it has already been considered that individual differences in motivation are essential for understanding people and for predicting their behaviour (Neel et al., 2016). Motives are sometimes described as *"private and internal characteristics of persons which impinge upon and coerce these persons into various behaviours"* (Blum and McHugh, 1971, p. 98). This entails that motives influence and force certain behaviour of a person. Nevertheless, Blum and McHugh (1971) also mention that within this description, motives are considered as concrete, private and mainsprings within people. But, despite this description, the authors believe motives are public and observable courses of action. This entails that they believe that motives are not only within people, but also public and observable actions. According to Bernard et al. (2008) motive is a term which refers to psychological (neurocognitive) adaptions that mediate a set of behavioural tendencies. This entails that *"motives are adaptational constructs that are presumed to guide behavior toward overcoming challenges within a specific social domain."* (Bernard et al., 2008, p. 18). Motives are independent and have discrete developmental histories (Bernard et al., 2008). Summarizing, motives influence individuals' behaviour. This research is interested in how motives influence people's selection behaviour and therefore their selection accuracy, which is useful information for creating an efficient co-creation process. The next section will look at how motives influence the selection accuracy of people.

Motives influencing selection accuracy

Besides intrinsic motivation, people can also be extrinsically motivated, which can sometimes conflict with intrinsic motivation (Bénabou and Tirole, 2003). Therefore, it is interesting to also research extrinsic motivation in this research. The relationship of intrinsic and extrinsic motivation with regards to selection accuracy will be discussed in the next part of this chapter.

Intrinsic and extrinsic motives

In the paper by Fernandes and Remelhe (2016) they mention that intrinsic and extrinsic motives influence individuals' willingness to participate in collaborative innovation activities. These intrinsic motives come from within an individual, primarily for its own sake. When trying to reach a certain outcome or avoid an undesired one, the extrinsic motives are present. This is associated with external incentives, like recognition by others, or monetary compensation. Both intrinsic and extrinsic motives can influence the willingness to engage in innovation activities, such as co-creation. Most people are motivated by both intrinsic and extrinsic motives. Intrinsic motives are for example fun and altruism, internalized extrinsic motives are for example learning and reputation, and entirely extrinsic motives are for example payment and career prospects. Fernandes and Remelhe (2016) mention that intrinsic enjoyment is one of the main drivers for engagement in creative activities. They also mention that participating in co-creation is related to extrinsic benefits, including social benefits, enhanced knowledge, and economic benefits (Fernandes and Remelhe, 2016). Social relations gained by participating in co-creation provide certain benefits for an individual such as a sense of belonging, and social identity (Fernandes and Remelhe, 2016). The need for information and enhanced knowledge also influences people's willingness to engage in co-creation because participants often seek help from other members, or desire to gain technological knowledge. This way, the members become a collective memory of individual interactions and cumulative expertise. Therefore, members learn more about each other, which also increases the social benefits. The last extrinsic motive is characterised by financial rewards, which can be directly (monetary prizes) or indirectly (visibility and intellectual property) (Fernandes and Remelhe, 2016).

Besides this, motivation is an important contributor to achievements of students (Uguroglu and Walberg, 1979), and motivation is related to outcomes such as curiosity, persistence, learning, and performance (Deci and Ryan, 1985). The study of Ayub (2010) showed that both intrinsic and extrinsic motivation are positively related to academic performance. Intrinsic motivation plays a significant role in achievement, competencies, and academic learning (Ayub, 2010). This all indicates that intrinsic and extrinsic motives are

related to achievement and performance. This study looks at the performance of the respondents when it comes to selecting ideas from a pool. Therefore, it can be assumed that intrinsic and extrinsic motivation also influence people's selection accuracy.

Summarizing the information from literature leads to certain hypotheses. These hypotheses will now be discussed and presented.

Hypotheses

First the hypothesis regarding intrinsic motivation will be discussed. The hypothesis regarding knowledge motives will be discussed next. Third the hypothesis regarding social motives will be discussed. Lastly, the hypothesis regarding financial motives will be discussed.

In the paper by Grant and Berry (2011) they mention that creativity and intrinsic motivation are connected to each other. When people are intrinsically motivated, they would be more creative (Grant and Berry, 2011), with creativity being the production of ideas that are original, feasible, and effective (Hao et al., 2016). When people are intrinsically motivated, they experience positive affect, which stimulates creativity (Grant and Berry, 2011). This is because being intrinsically motivated creates a broader range of cognitive information, which results in more attention for a wider set of ideas, and intrinsic motivation leads to encouraging cognitive flexibility for recognizing patterns and associations between ideas (Amabile et al., 2005). Intrinsic motivation also promotes people's creativity by encouraging persistence (Grant and Berry, 2011).

Like mentioned before, intrinsic motivation plays a role in achievement, competencies, and academic learning. Ayub (2010) mentioned that intrinsic motivation is positively related to academic performance. Intrinsic motivation can improve the quality of a workers output (Rogstadius et al., 2011). When people are intrinsically motivated, they typically perform at relatively high levels (Makki and Abid, 2017) and they would be more creative (Grant and Berry, 2011). Summarizing, this entails that intrinsic motives are positively related to performance and creativity.

The study of Ayub (2010) showed that the performance in selecting ideas is related to intrinsic motives, and therefore it is assumed that intrinsic motives are also related to the selection accuracy of selecting ideas. When looking into the performance of selection, selection is considered a task, in which someone needs to perform. Therefore, the selection accuracy is connected to how well someone performs in this task. Since intrinsic motivation is positively related to performance and creativity, it is assumed that intrinsic motives have a positive

relation to selecting creative ideas, and therefore, the selection accuracy of this. This results in the following hypothesis:

Hypotheses 1 (H1): Intrinsic motivation is positively related to selection accuracy of creative ideas in the co-creation process.

The literature about extrinsic motives is a bit contradictory. As mentioned before, extrinsic motivation consists of financial, social, and knowledge motives. First the knowledge motive and the social motive will be discussed and lastly the financial motive will be discussed.

In the paper by Fernandes and Remelhe (2016) they mention that the need for information and enhanced knowledge influences people's willingness to engage in co-creation, because participants often seek help from other members or desire to gain technological knowledge. Previous study has found a strong correlation between effort and building human capital (Hars and Ou, 2002), and human capital as a determinant for productivity refers to capabilities, personal skills, and knowledge (Wu, Gerlach and Young, 2007). This study illustrated that people show more effort for a task or job when they gain human capital, thus capabilities, personal skills, or knowledge. Effort is related to performance, because when people think, their effort will lead to required outcomes and they will perform better (Fong and Tosi Jr, 2007). Wu et al. (2007) also mention that the level of motivation for specific behaviour is connected to individual's expectancies towards particular outcomes. This entails that individuals would put in more effort when they expect to receive a particular outcome. This means that when someone has a knowledge motive, they want to gain knowledge. When they expect to receive this from participating in co-creation, they will put in more effort which will probably lead to a better performance. Makki and Abid (2017) also conclude that extrinsic motivation in general is positively correlated with employee's task performance, and selection accuracy is, like mentioned before, a task is which someone should perform. Therefore, it is expected that the task performance of selection accuracy will also increase when individuals expect to receive knowledge from participating in co-creation, when gaining knowledge is desired.

This results in the following hypothesis:

Hypotheses 2 (H2): The desire to share and acquire knowledge is positively related to selection accuracy of creative ideas in the co-creation process.

When people are socially motivated to participate in co-creation, they can be looking for a reputation within a desired in-group, expertise recognition, strengthening ties with relevant

others, gaining a sense of belonging, or for a social identity (Fernandes and Remelhe, 2016). People would engage in co-creation because they enjoy interacting with like-minded people (Füller et al., 2010). For this motive it is also the case that people put in more effort when they expect to receive a particular outcome (Wu et al., 2007). Therefore, people who are socially motivated will put in more effort when they expect to receive, for example, social identity or a sense of belonging. Since effort is connected to performance and selection accuracy is connected to task performance, the following hypothesis is formulated:

Hypotheses 3 (H3): The desire to gain social rewards is positively related to selection accuracy of creative ideas in the co-creation process.

Lastly, financial motives will be discussed. Research has shown that people show greater interest in a task when they do not get paid compared to when they do get paid (Bénabou and Tirole, 2003). People tend to show better compliance in the beginning when receiving a reward, but worse compliance in the long run than people who are in the 'non-reward' or 'untreaded control' group (Bénabou and Tirole, 2003). Bénabou and Tirole (2003) conclude that this entails that there is a limited impact of rewards on 'engagement', which is the current activity, and a negative impact on 're-engagement', which is persistence. This entails that there is a negative relation between financial motives and performance, but the willingness to participate has a positive relation with financial motives (Rogstadius et al., 2011). Within this study it will be tested whether people think they would be more likely to participate in a co-creation, when they would receive an incentive, and then how this influences their selection accuracy. Since study does show that the willingness to participate is positively related to financial motives, it is assumed that this will also be the case for this study. But since financial motives are negatively related to performance, it is assumed that when people would like to receive a financial reward for participating, their performance will be worse. Like mentioned before, performance is linked to selection accuracy, since selection is a task and the performance of a task can be measured, and the measurement of selection is the accuracy of the selection. So therefore, the selection accuracy will most likely be worse when people want a financial reward for participating, than when people do not want a financial reward for participating. Rogstadius et al. (2011) also mention in their paper that motivating factors such as monetary rewards do generally increase worker's willingness to do a task or the speed in which a task is done but does not improve the quality of the work. Resulting from these different studies it can be stated that monetary rewards seem to have a negative effect on performance.

This results in the following hypothesis:

Hypotheses 4 (H4): The desire to attain financial rewards is negatively related to selection accuracy of creative ideas in the co-creation process.

The theory described above and the mentioned hypothesis result in a conceptual framework, which is presented in the following and last part of this chapter in figure 1.

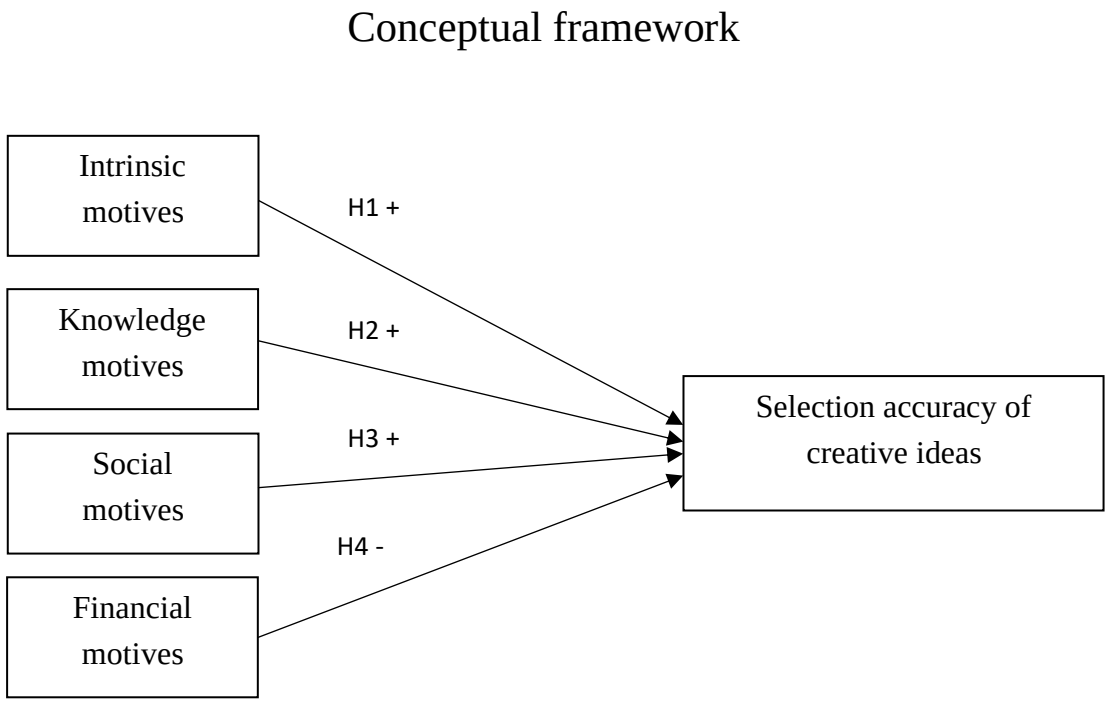

Figure 1: Conceptual framework

3. Methodology

In this chapter the methodology of this research will be discussed. First the research method will be presented, after which the sample size is explained. Then the operationalization is described and shown. Subsequent, the procedure of the research is shown and then the method of research analysis is discussed. Finally, the limitations and research ethics will be discussed.

Research method

This research is a quantitative research. Quantitative research is a research method that tries to explain phenomena by collecting numerical data which will be analysed using mathematically based methods, which in particular are statistics (Sukamolson, 2007). Quantitative research has an almost unlimited number of phenomena that can be studied, which makes it a quite flexible research method (Sukamolson, 2007). Since hypothesis will be tested, a deductive approach is used.

The hypothesis will be tested via conducting a survey. A survey is "*a system for collecting information from or about people to describe, compare or explain their knowledge, attitudes and behaviour*" (Bougie and Sekaran, 2020, p. 105). The goal of this research is to collect information about people's behaviour in selecting ideas, therefore, a survey fits this research. A survey is conducted with a sample of people of the population, and this sample is a friction of the population being studied (Scheuren, 2004). The survey will be deducted in an online setting. One of the advantages of an online survey is the global reach (Evans and Mathur, 2005). Online surveys are also very flexible, since they can be conducted in several formats and they can easily be tailored to, for example, customer demographics or language (Evans and Mathur, 2005). Online surveys are also very convenient, since the respondent can fill in the survey at a convenient time for themselves (Evans and Mathur, 2005). Therefore, this is a good method to use for this research, which makes it possible to reach as many respondents as possible. There is also an ease of data entry and analysis, since it is relatively easy for the respondents to fill in the survey and the online setting makes it easy to tabulate and analyse the responses (Evans and Mathur, 2005). Online surveys also make it possible to have question diversity, such as multiple-choice questions, scales, and dichotomous questions (Evans and Mathur, 2005). This is convenient since this survey will exists of multiple-choice questions, Likert scales, but also ranking questions (selection questions). Besides this, online surveys make it possible to easily obtain a large sample, to control the order of the answers and there

can be a required completion of the answers (Evans and Mathur, 2005). The online setting which will be used is Qualtrics.

Sample size

Population

When collecting data in quantitative research, the data should be collected from someone or something, and the people that the data is collected from are called the research unit (Sukamolson, 2007). Since not the whole population can be investigated, there will be a sample size, which is also called a sampling unit, and the findings of the sampling unit can be generalized to the population (Sukamolson, 2007). This entails that it is not possible to investigate the entire population, and therefore, the aim is to collect a representative sample. If the sample is representative, it will be possible to generalize the results back to the population. The population for this study is a diverse range of people, which are Dutch consumers over the age of eighteen. The goal is to collect data from a diverse group, so a broad view of opinions will be collected. This entails a population of youngsters and older people, males and females (or other), people with different educational levels and backgrounds and different ethnicities.

Sampling technique

Since there is neither the time nor the resources to analyse a whole population, a sampling technique has to be applied to reduce the number of cases (Taherdoost, 2016). There are two main sampling techniques, which are probability or random sampling and non-probability or non-random sampling (Taherdoost, 2016). Whitin probability sampling everyone in the population has an equal chance of being included in the sample, and within non-probability sampling there is a specific and non-random group, or case, selected (Taherdoost, 2016). The aim of this research is to have a diverse sample, and therefore a probability sampling technique is preferable. Nevertheless, the researcher does have a limited network via which the survey will be deducted and the convenience sampling, which is a non-probability sampling technique (Taherdoost, 2016), will be used. Convenience sampling entails using acquaintances as the sample, since readily and easily available (Taherdoost, 2016). Therefore, this research will mainly be limited to a non-probability sampling technique.

A link to the survey will be send to friends, family and acquaintances via social media platforms, and they will be asked to participate in the study. This does have implications for the representativeness of the sample, and therefore, the aim will be to reach a group that is as diverse as possible.

Sample size

There is no simple rule for a sample size that can be used for all surveys, because this depends on the professional and financial resources available (Scheuren, 2004). The minimum ratio for the sample size with multiple regression analysis is 5:1, which entails five observations per independent variable (Hair et al., 2018). Nevertheless, the desired level is between fifteen to twenty observations for each independent variable (Hair et al., 2018). In this research there are four independent variables (intrinsic motives, knowledge motives, social motives, and financial motives), which entails that the desired sample size is between sixty and eighty. When this number of observations is reached, the results should be generalizable if the sample is indeed representative (Hair et al., 2018).

Operationalization

Now the operationalization of the research will be discussed. First the operationalisation of the idea pool is discussed, then of the IV's and afterwards the DV's. Finally, some other questions will be presented. The specific steps which the participants will take in the survey are shown afterwards.

Idea pool

Like mentioned before, the focus of this study is on sustainable innovations, connected to the seventeen sustainable development goals of the UN. Since the time is limited, this research will focus on one of the seventeen goals of the UN. The focus is on goal twelve, which stands for responsible consumption and production. Now it will be discussed how the sustainable innovative ideas for the survey were generated. A brainstorm session took place with six master students have led to a total of one hundred and thirteen ideas. The students selected the three most and least creative, original, feasible and effective ideas from this pool of ideas. The total amount of which an idea was chosen in a category defined the score of that idea. Duplicate ideas were deleted, and similar ideas were grouped together. Ideas that had nothing to do with sustainable packaging were also deleted from the idea pool. This resulted in a total of fifty ideas. all the ideas that were not selected as most or least creative, original, feasible or effective were also deleted from the idea pool. This resulted in twenty-nine ideas in the pool. The ideas that were only selected by one student as most or least creative, original, feasible or effective, are also deleted from the idea pool. This resulted in keeping sixteen ideas in de pool. The two ideas with the highest score, which is the sum of all the chosen items on the six dimensions, in each category, are selected. When a clear choice was made, the idea cell was coded with a colour

which match the category (yellow is original, blue is feasible, and red is effective). When there was a tie, all the cells of all the ideas within this tie are coded with a lighter colour, like light blue for example. It was taken into account when an idea was both chosen as most and least original, feasible or effective. This did not yet result in a definitive top two and therefore, it was decided which ideas are most distinctive. These are ideas that score high on the category but not within the other dimensions. The idea with the lowest sum of score on the other two dimensions (overall originality / feasibility / effectiveness = max(most,least)-min(most,least)) has been chosen. This led to eleven ideas, because 'bring your own packaging' is chosen as least original and most feasible. Finally, to get a balanced set of ideas (two for each category), it was checked which idea was on the third place for least original and most feasible. The third idea in the category most feasible is 'smart packaging'. Nevertheless, this idea was already chosen as most effective. The third choice in the category least original is a tie for 'no packaging' and 'return of plastic bottles on train stations'. Since 'no packaging' was already chosen as most effective, the idea 'return of plastic bottles on train stations' is chosen as twelfth idea. This resulted in the twelve ideas which are shown in Appendix 1.

Independent variables

The independent variables, which are 'intrinsic motives', 'knowledge motives', 'social motives', and 'financial motives', are measured via conducting a survey in which it is tested which motives participants would have for participation in co-creation, and how these motives. To test which motives people have to participate in co-creation, the questionnaire of Fernandes and Remelhe (2016) is used as an example. Therefore, the scale is based on what previous studies have done, and thus have been checked for validity and reliability. Reliability is an assessment of the degree of consistency between multiple measurements of a variable, and validity is the extent to which a single variable or a set of variables correctly represent the concept of the study (Hair et al., 2018). The items are sometimes adjusted, for the scope of this research, since this differs from the scope of the study by Fernandes and Remelhe (2016). The original questions from Fernandes and Remelhe (2016) are shown in Appendix 7. This research asks participants about their motives for participation in co-creation in general and is not conducted during an actual co-creation process. The independent variables are answered on a seven-point Likert scale, showing how much the participants disagree or agree, with the statements based on the following question: "I would be more willing to participate in co-creation, because…". This results in the following operationalization, which is shown in table 1.

Variables	Measurement
Intrinsic motives **(IV)**	"I would be more willing to participate in co-creation, because…" - I am curious - I enjoy to keep up with new innovations and new ideas - I like to support innovative ideas for the UN's sustainability goals
Knowledge motives **(IV)**	"I would be more willing to participate in co-creation, because…" - To improve the idea selection of sustainable development ideas - To gain more knowledge about sustainable development innovations
Social motives **(IV)**	"I would be more willing to participate in co-creation, because…" - To get in touch with … (the researchers?) - Because I believe in the values and norms of the UN's sustainability goals.
Financial motives **(IV)**	"I would be more willing to participate in co-creation, because…" - I would receive an incentive/reward.

Table 1: Operationalization of the IV's

Dependent variables

The DV selection accuracy is measured via using expert scores. A creative idea is like mentioned before an idea which is highly original and highly feasible (Diehl and Stroebe, 1987) and effective (Hao et al., 2016). In previous similar selection studies, participants were asked to select between four to six most creative ideas (see: Rietzschel et al., 2010; De Buisonje et al., 2017; Zhu et al., 2017). This study will ask for only the three most creative ideas, since there are only twelve ideas to choose from, and this will therefore be more suitable. The experts had to select the three most creative ideas from the same pool of ideas as the consumer respondents, and then also rate these three ideas from most creative to least creative. This method is used since similar study's also did this for calculating the selection accuracy (e.g., Van Damme, Anseel, Duyck, Rietzschel, 2019; Zhu, Ritter, Dijksterhuis, 2020; Zhu, Ritter, Dijksterhuis, 2021). Experts were asked to also rate the twelve sustainable innovation ideas, which entails they first had to select three ideas they think are the most creative, which is an idea that is original, feasible and effective, and then they were asked to rate these three selected ideas from most creative to least creative. The respondents were asked to do the same. Average scores were calculated in Excel, after calculating the ICC, which is discussed later, based on how the experts rated the ideas. These scores were assigned to the twelve ideas, for creativity, originality, feasibility and effectiveness. The scores are between one and seven, since all the ideas are evaluated on a seven-point Likert scale. This resulted in four scores for the

respondents, for the three ideas they selected, a different score for all four dimensions (creativity, originality, feasibility and effectiveness). This results in three creativity, originality, feasibility and effectiveness scores for all the respondent, namely for idea one, two and three. And out of these three scores an average creativity score was calculated for selecting a top three of most creative ideas, and an average originality, feasibility and effectiveness score. The score for only selecting a top one idea is also known, which is the score for only selecting the first idea, which is ranked as the most creative, original, feasible and effective. This results in all the respondents having a selection accuracy score for the ideas they have selected and ranked on the four dimensions. The specific steps are described below.

Steps

Step one is making expert evaluation scores, by creating an average score for each of the twelve ideas for creativity, originality, feasibility and effectiveness. This results in an average creativity score per idea, an average originality score per idea, an average feasibility score per idea, and an average effectiveness score per idea. Step two is to make top one score for the consumers. This results in an average top one creativity score, an average top one originality score, an average top one feasibility score, an average top one effectiveness score. This is calculated for all the consumer respondents. Step three is making top three scores. This is done via repeating step two for the top two and top three selected ideas. The ideas that are ranked as second and third get the same expert score for that idea as when it would have been selected first, since this is the score the experts gave that idea.

Finally, the average creativity score of the three selected ideas can be calculated for creativity, originality, feasibility and effectiveness. These scores are the accuracy scores for each individual respondent and are named totalscore_creativity, totalscore_originality, totalscore_feasibility, and totalscore_effectiveness, which are the dependent variables of this research. To measure the influence of only selecting a top one score, there are four extra DV's, which are names top1_creativity, top1_originality, top1_feasibility and top1_effectivenss.

The next part of this chapter will explain the steps the respondents, both the experts and the consumers, have to take for participation.

Other question

Finally, there are some other questions that will be asked. Demographic information will be collected, to be able to compare the sample to the population, and to get more information about what kind of experts participated in the survey. The consumer respondents are asked about their

age, gender, and highest finished education. The expert respondents are asked about their field of expertise, years of experience, most recent job title, and the industry they work in.

The next part of this chapter shows the procedure the participants, both consumers and experts, will take when filling in the survey.

Procedure

The participants filled in the survey via an online program, which is called Qualtrics. The survey is shared with the respondents via a link, which is shared via different social media channels, like WhatsApp and Facebook. The survey consists out of several steps, which are discussed now, first the steps for the consumers and then for the experts.

Steps for the consumer respondents

First the respondents have to open the survey via a link. They will first be presented with an introduction, with relevant information, such as the duration of the survey and the goal of the research. Then they have to accept the informed consent form, to be able to continue with the survey. The consent form (which is at the beginning of the survey), and the survey is shown in Appendix 6. When respondents have agreed to continue, they are presented with questions regarding the independent variables. Then the respondents are presented with the context of the problem, which is goal twelve of UN sustainable development goals, about responsible consumption and production. Then the twelve ideas which should help solving this problem are presented, after which they are asked to select the three most creative ideas in their opinion. Then they are asked to rank the three ideas they selected from most creative (1) to least creative (3). Finally, they will be asked to fill in the demographic information, which is their age, gender, and highest finished education. Finally, they are tanked for their time and participation.

Steps for the expert respondents

First the respondents have to open the survey via a link. They will first be presented with an introduction, with relevant information, such as the topic of the survey. Then they have to accept the informed consent form, to be able to continue with the survey. The consent form (which is at the beginning of the survey), and the survey is shown in Appendix 6. When respondents have agreed to continue, they are presented with the context of the problem, which is goal twelve of UN sustainable development goals, about responsible consumption and production. Then the twelve ideas which should help solving this problem are presented, after which they are asked to select the three most creative ideas in their opinion. Then they are asked to rank the three

ideas they selected from most creative (1) to least creative (3). Finally, they will be asked to fill in the demographic information, which is their field of expertise, years of experience, most recent job title, and the industry they work in. Finally, they are tanked for their time and participation.

The following section will show how the results from the survey are analysed.

Method data analysis

This research consists out of in total eight dependents variables (a top three and a top one for creativity, originality, feasibility and effectiveness), and four independent variables (intrinsic motives, knowledge motives, social motives, and financial motives). First a factor analysis is performed to test the IV's, after which a multiple regression analysis is used, which is the statistical technique that can be used in a situation like this (Hair et al., 2018). Within multiple regression analysis, six assumptions are tested. All the methods are discussed more in dept in the next chapter.

Research ethics

To make sure the research ethics are protected, the Netherlands Code of Conduct for Research Integrity (Algra et al., 2018) is used. The Netherlands Code of Conduct for Research Integrity (Algra et al., 2018) states that research can be expressed in terms of a number of guiding principles, which are honesty, scrupulousness, transparency, independence and responsibility. Honesty among other things entails reporting the research process accurately, taking alternative opinions and counterarguments seriously, which is done throughout this whole paper. Scrupulousness stands for *using methods that are scientific or scholarly and exercising the best possible care in designing, undertaking, reporting and disseminating research* (Algra et al., 2018, p. 13). The methods that are used are based on scientific and scholar literature, which is shown in the reference list at the end of this paper. Transparency entails among other things that is should be clear what data the research was based on, and how this data was obtained, what and how the results were achieved, and the role of external stakeholder. The aim of this research is to describe all the steps that are taken as clearly as possible, to guarantee transparency. Independence means, among other things, that it will not be allowed to let the choice of method, the assessment of the data, the weight attributed to alternative statements or the assessment of others' research to be guided by non-significant or non-scholarly considerations (Algra et al., 2018). The reference list also shows that this has been done. Lastly, responsibility entails, among other things, that conducting research is scientifically and/or

socially relevant. The scientific and social relevance is described in chapter one. This will all be taken into account when conducting this research and when writing this paper.

This research aims at protecting the privacy of the respondents who participate in the research. Therefore, the respondents will remain anonymous. The online survey makes it possible for the respondents to stay anonymous, since the researcher will not know who answered what. Since this is also not necessary to know in order for this research to succeed, this will not stand in the way of gaining useful information from the participants.

Besides this, throughout the total research the researcher takes their own role into account and tried not to influence the research and the findings. This is done by critically reflecting on their own role and by receiving peer review from the people in the thesis circle, which will make it possible for other researcher to critically reflect on whether the researcher has succeeded in this (Research Ethics in Quantitative Research, 2021). This entails that it is the goal of the researcher to stay objective, in order to be able to have good quantitative research (Research Ethics in Quantitative Research, 2021). To be able to show the objectivity of the data, the statistical output of the gathered data is presented in this paper, this way readers can judge whether they think the presented data remained objective. The process of how the researcher came to the conclusion is also presented, in order to show readers the objectivity, which gives research transparency. By providing research transparency of the whole process, the research can be replicated and tested. This provides data access, production transparency and analytical transparency.

The following is also done to protect the anonymity of the respondents. Only number codes are used to link respondents to the questionnaire, and the statistical output will be tabulated by broad enough categories so that individual respondents cannot be singled out (Scheuren, 2004).

Data preparation

Deleting respondents

There are a few reasons why respondents are deleted from the analysis. When people at the beginning of the survey do not agree with the consent form, they will be directed to the end of the survey and therefore, there will not be any useful data from them, these respondents will therefore be deleted. It could also be the case that people drop out during the survey, and when they did not fill in all the questions connected to either the IV's or the DV's of this research, their answers are not useful and therefore, these respondents will also be deleted from the analysis.

Another reason why respondents could be deleted is outliers. Outliers are observations that have large residual values, and which can be identified only with respect to a specific regression model (Hair et al., 2018). This has been tested with a boxplot with is presented in Appendix 4. There are no substantial outliers, based on Hair et al. (2018) and therefore, no respondents had to be deleted.

The number of respondents before deletion was 426 respondents, and the number of respondents after deletion is 289 respondents.

Missing data analysis

For the selection questions in the survey there are a lot of missings in the data, but these are valid missings. This is because all the respondents who are now still in the data set, filled in all the questions until the demographic questions, but the respondents had to select only three ideas, and therefore each respondent will have missing values for the other 9 ideas, which they did not select.

A Littles MCAR test is performed, and this test is not significant (p=1,000) and therefore, it fails to reject the null hypothesis, which entails that the data is missing completely at random.

ICC

An Interclass correlation (ICC) statistics test two-way random is used, which is a measure of the degree of dependence among individuals within higher-level grouping. It represents the expected correlation in the DV between two at random drawn units in a level (Hair et al., 2018). Individuals should be independent, otherwise the assumption of regression is violated (Hair et al., 2018).

Items could not be deleted from the analysis, since when the ICC test was performed, the surveys were already filled in by the respondents with all the items included. The selection accuracy of the respondents could not be calculated and described based on the survey they filled in, if an item would have been deleted after deducting the survey. This is because the respondents did have the possibility to select items that are deleted afterwards, and they would not get a selection score for choosing this item, which would result in relatively low selection scores. The limitation of this will be discussed in chapter five. Therefore, it is tested what would happen when an expert would be removed from the analysis, to increase the reliability of the expert scores. Trial and error were used to see which expert should be deleted to increase the reliability. When deleting expert number three or number four, the Cronbach's alpha would

improve. Table 2 and table 3 below show the Cronbach's alpha values from this. This resulted in deleting expert three, since this gave the best reliability values. The expert has been deleted and the new selection accuracy score were calculated based on the now five experts in the panel.

Deleting expert number 3

DV measure	Cronbach's alpha
Creativity	0,634
Originality	0,758
Effectiveness	0,635
Feasibility	0,821

Table 2: Deleting expert 3

Deleting expert number 4

DV measure	Cronbach's alpha
Creativity	0,672
Originality	4,845E-16
Effectiveness	0,597
Feasibility	0,756

Table 3: Deleting expert 4

4. Results

This chapter shows the results, by first looking at the representativeness of the sample, then the factor analysis is presented, thereafter, the assumptions that needed to be tested are shown and lastly, the results from the multiple regression analysis are presented.

The sample

The output for 'gender' showed the following. The CBS does not take 'other' categories then 'male' and 'female' into account, but in this study, there was the possibility to select the category 'other', which 2,8% of the respondents has selected. Since this cannot be compared with the scores of the population, this category will not be taken into account for this analysis and will be considered as missing data. The critical value with 1 degrees of freedom with an alpha of 0,05 is 3,84. The chi-square value is p=0,011 (< 3,84). The significance level is 0,915 which is bigger then 0,05 and therefore accepted. Therefore, H0 is accepted, which entails that the sample size is representative for the gender of the population.

In terms of 'education' there were more expected frequencies than sample frequencies, because the first category (primary school) had a value of 0 in the sample group, therefore it was not possible to include it in the analysis. This category is therefore deleted from the analysis, to be able to test the other categories for representativeness. The chi-square value is significant (p=0,000). Therefore, H0 is rejected, and the sample is not representative for the education of the population. The frequency table shows that 'VMBO or MBO1', 'Havo or VWO year 1-3', 'MBO 2, 3 or 4' are all underrepresented. 'Havo or VWO year 4-6' is slightly overrepresented, and 'hbo bachelor or WO bachelor' and 'hbo master or WO master or doctor' are overrepresented in the sample group.

Since the sample for this study starts with the age group of 18 years and older, the group of 0-18 is not considered in this study, and this is taken into account when calculating representativeness. The group form 0 up to 18 is deleted from the analysis and the population group. The Chi-square is significant, p = 0,000 (smaller then 0,3 with alpha of 0,05) and therefore, H0 is rejected, and the sample size is not representative of the population for the category 'age'. The group between 20-40 is overrepresented in the sample, and the other groups are underrepresented.

A factor analysis was performed, which will now be discussed.

Factor analysis

The items that are used in the survey are not completely based on literature but adjusted for the scope of this research. Therefore, it is important to see whether statistics extract the same variables as literature does. An exploratory factor analysis is used to test this, which is an interdependence technique, whose main purpose is to define the underlying structure among variables in the analysis (Hair et al., 2018). Principal axis factoring (PAF) is an exploratory factor analysis procedure. PAF has a few advantages, compared to the maximum likelihood estimation (ML), which is another frequently used and recommended method (Grieder and Steiner, 2021). One of the advantages is that it has no distributional assumptions, second it is more robust in the case of unequal factor loadings, few indicators per factor, and small sample sizes (Grieder and Steiner, 2021). The variables of this study have an unequal number of indicators per factor and some factors only have a few indicators. Namely, financial motives have only one indicator and knowledge motives has only two indicators. Therefore, the PAF method is most suited for this study and used.

All the relevant output of principal axis factoring is shown in Appendix 3. The Bartlett's test of sphericity is a statistical test for the presence of correlations among the variables, and it provides the statistical significance which indicates that the correlation matrix has significant correlations among at least some of the variables (Hair et al., 2018). Kaiser-Meyer-Olkin (KMO) is a measure of sampling adequacy, and it shows the ratio of the squared correlation to the variables between squared partial correlation between variables (Field, 2018). This test results in a KMO value of 0,822 which is above the critical value of 0,5, the Bartlett's test shows a significant value ($p=0,000 < 0,05$) and therefore, there are significant correlations among the variables. The communalities should have an extraction value of 0,2 or higher, it is shown in the table that all the values are above this critical value. The eigenvalues should be bigger than 1 to extract the factor. This is only the case for two factors, and therefore, based on this analysis it could be concluded that only two factors are extracted, instead of the expected four factors based on literature (intrinsic motives, social motives, knowledge motives and financial motives). The reliability of the factors is shown in table 4 below.

The factors were rotated to see if this shows better results, since unrotated factor solutions do not always provide sufficient information on the variables that are examined. Hair et al. (2018) state that unrotated factor solutions extract the factors in the order of their variance extracted. Therefore, within the unrotated factor solution, the first factor is likely to be the factor with all the loadings in the factor being significant. This is not enough, therefore the VARIMAX

orthogonal rotation was performed, which allows for making the interpretation of principal axis factoring to be easier (Hair et al., 2018).

The extraction values are still above 0,2 (Appendix 3). The eigenvalue shows an extraction of again only 2 factors, since only two factors have an eigenvalue above 1. The rotated factor matrix shows that most values load on factor 1 and only the items social_3 and financial_1 load on factor 2. The Cronbach's alpha is p=0,849 for factor one and p=0,531 for factor two. Thereafter, the PAF is tested with a fixed number of 4 factors, since literature shows that there should be four factors. This will first be done without rotation and then with VARIMAX rotation, to see if there is a difference.

The communalities all have a value above 0,2 and are therefore, above the critical value (Appendix 3). The items now load on the four fixed factors, but they do not match with the items with whom they are supposed to match according to literature. Also, when looking at the Eigenvalues, it could be argued that again there are only two factors on which all the items load, since only two values have an Eigenvalue above 1. The factor matrix shows that there are no double loaders, since it would only be a double loader when the difference of the values is smaller than 0,2. Thereafter, a VARIMAX rotation is executed with four fixed numbers. The VARIMAX rotation with four fixed numbers also shows that all items load on only two factors. Besides this, the Cronbach's alpha of the four-factor solution is lower than the Cronbach's alpha of the two-factor solution, which is shown in table 2.

The four-factor solution showed that the items load on other factors then what is expected from literature. Therefore, the four-factor solution is not more useful then the two-factor solution, and the two-factor solution is the only one that is substantiated by the FA. Also, the Cronbach's alpha is the highest for the two-factor solution, it does remain the same for factor 2 from the two-factor solution and factor four from the four-factor solution, since both factors are based on the same items. Therefore, this study will therefore continue with 2 factors, since only two factors are clearly extracted in the factor analysis, which is concluded based on the eigenvalues. Based on literature it was expected to have four factors, but this is not analytically substantiated, concluding, this study will continue with the two factors that are extracted from the factor analysis, since this statistically the best option. This does have implications for answering the hypothesis, since the 'new factors' differ from the factors that are used in the hypothesis. The conclusion will therefore focus on answering the research question, without giving answers to the hypothesis.

The four factors from theory were intrinsic motives, social motives, knowledge motives and financial motives. The rotation factor matrix (of two factors) shows which items load on

which ‘new’ factor (Appendix 3). There are no double loaders (since all the values have a bigger difference than 0,2).

All the items that load on factor 1 have in common that it can be argued that they all look like intrinsic motives, so motives that come from within a person. The two items that load on factor 2 have in common that they seem both more like external motives, in a sense that gaining social status and gaining money is both something that someone else is needed for, someone else makes you feel like you gain social status, you need other people for this, and other people also give you the money. The other items, that load on factor 1 can all be created from the person itself. The first three items are already classified as intrinsic motives, knowledge_1 and knowledge_2 and social_1 and social_2 can come from a person’s own aspiration to do something, while social_3 can be seen as something that is more external. It seems that the items that are internalized extrinsic are not external enough to be recognized as external in factor loading and therefore are more internal motives (when looking at factor loading) and gaining social status and a financial reward are more external motives (when looking at factor loading).

Factor 1 is named ‘Intrinsic motives’ (which includes mainly intrinsic and internalized extrinsic factors), and factor 2 is named ‘Extrinsic motives’ (which includes the fully extrinsic item and one internalized extrinsic item). In further analysis only these two factors will be used. How these factors are recoded in SPSS and the reliability of the factors are shown in Appendix 3. The next section will discuss the assumption checking, before the regression analysis can be deducted.

The following table shows an overview of the reliability of the factors.

	Number of items	**Items**	**Cronbach’s alpha**
All original items	9	Intrinsic_1, Intrinsic_2, Intrinsic_3, Knowledge_1, Knowledge_2, Social_1, Social_2, Social_3, Financial_1	0,777
		Original construct	
Intrinsic motives	3	Intrinsic_1, Intrinsic_2, Intrinsic_3,	0,705
Knowledge motives	2	Knowledge_1, Knowledge_2,	0,795
Social motives	3	Social_1, Social_2, Social_3,	0,567
Financial motives	1	Financial_1	This factor has only 1 item, so could not be tested
		Two factor solution	
Factor 1 Intrinsic motives	7	Intrinsic_1, Intrinsic_2, Intrinsic_3, Knowledge_1, Knowledge_2, Social_1, Social_2	0,849
Factor 2 Extrinsic motives	2	Social_3, Financial_1	0,531

Four factor solution			
Factor 1	3	Knowledge_1, Knowledge_2, Social_1	0,790
Factor 2	2	Intrinsic_3, Social_2	0,736
Factor 3	2	Intrinsic_1, Intrinsic_2	0,681
Factor 4	2	Social_3, Financial_1	0,531

Table 4: Reliability of the factors

Assumptions checking

After deducting the factor analysis, the assumptions were checked, before a multiple regression analysis was performed.

First the outliers are checked for the IV's (intrinsic and extrinsic motives) and for the DV's (Top1_originality, Top1_feasibility, Top1_effectiveness, Top1_creativity, Totalscore_originality, Totalscore_feasibility, Totalscore_effectiveness, Totalscore_creativity). A boxplot was plotted to see if there are any substantial outliers. This results in no substantial outliers, which entails no respondents had to be deleted.

The assumptions that had to be checked are linearity, multicollinearity, values of residuals are independent, homoscedasticity, normality, and if there are no influential cases biasing the model.

Assumption 1 Linearity

Linearity is used to show that the mode possesses the properties of additivity and homogeneity, and linear models predict values that fall in a straight line, by having a constant unit change of the DV for a constant unit change of the IV (Hair et al., 2018).

Assumption 2 Multicollinearity

It should be tested whether there is multicollinearity in the data or not, the goal is to not have multicollinearity, because then the predictors are not too highly correlated with another (Hair et al., 2018). This is tested via multicollinearity diagnostics.

Assumption 3 Values of the residuals are independent

This entails that the observations need to be independent from one another, or uncorrelated (Hair et al., 2018). This is tested via Durbin-Watson statistics.

Assumption 4 Homoscedasticity

Homoscedasticity entails that the variance of the residuals is constant, which entails that the variation in the residuals is similar at each point across the model (Hair et al., 2018). This is

tested by looking at the scatterplot of the whole model, and not only the individual predictors. When heteroscedasticity occurs, it is the result of non-normality of one of the variables.

Assumption 5 Normal distribution

The values of the residuals should be normally distributed. This is done by looking at the distribution of the residuals, via normality probability plot. When the variation from the normality distribution is sufficiently large, then all statistical tests are invalid, which is not a problem (Hair et al., 2018). The normality test will be provided to show this is indeed the case for this sample, but violation of this assumption is not a problem.

Assumption 6 There are no influential cases biasing your model

It is not preferable to have outliers or influential data points influencing the model, because this would make the data set less representative as a whole. To test whether there is any influential data biasing the model, Cook's Distance is used.

The full data analysis of the assumptions checking is presented in appendix 4 and the following table presents an overview of this (table 5).

DV	**Assumption 1 Linearity**	**Assumption 2 Multicollinearity**	**Assumption 3 Independent residuals**	**Assumption 4 Homoscedasticity**	**Assumption 5 Normality**	**Assumption 6 No influential bias**
Totalscore_Creativity	Violated	Been met	Been met	Been met	Possibly violated	Been met
Totalscore_Originality	Violated	Been met	Been met	Been met	Possibly violated	Been met
Totalscore_Feasibility	Violated	Been met	Been met	Been met	Possibly violated	Been met
Totalscore_Effectiveness	Violated	Been met	Been met	Been met	Possibly violated	Been met
Top1_Creativity	Violated	Been met	Been met	Violated	Violated	Been met
Top1_Originality	Violated	Been met	Been met	Violated	Violated	Been met
Top1_Feasibility	Violated	Been met	Been met	Violated	Violated	Been met
Top1_Effectiveness	Violated	Been met	Been met	Violated	Violated	Been met

Table 5: overview of the assumptions

The assumption of linearity has not been met for any of the DV's. To see if linearity could be improved, transformations were performed. The transformations that can be used to reach linearity are squaring a variable, polynomials can be made, creating a logarithm or making an inverse (Hair et al., 2018). All these transformations are performed. The transformations were first performed on the IV's, this did not result in linearity for any of the DV's. Then the transformations were also performed for the DV's, which also did not result in linearity. The

full analysis is shown in Appendix 4. For the sake of this research, a regression analysis is still performed, since there was no time to find other solutions and possible reasons for why there is no linearity, even after transforming the IV's and the DV's. This does have implications for the further analysis of the relationship between the IV's and the DV's, which will further be discussed in the limitations in the fifth chapter.

This should carefully be taken into account when looking at the results from the multiple regression analysis, which will be presented in the next part of this chapter.

Normality is also (possibly) violated for all the DV's, but as mentioned before, this is not a problem for this study, so this can be ignored.

Homoscedasticity is violated for the last four DV's. The normality for these DV's is also violated and as mentioned before, heteroscedasticity occurs when there is non-normality of one of the variables. So, this is a logical consequence and insurmountable.

Since the assumption of linearity has not been met for all the DV's, it is questionable whether or not to use a linear regression analysis. Therefore, the other dependence techniques are considered. The other dependence techniques are multivariate analysis of variance (MANOVA), Multiple Discriminant Analysis, and Logistic regression.

MANOVA is "*a dependence technique that measures the differences for two or more metric dependent variables based on a set of categorical (nonmetric) variables acting as independent variables"* (Hair et al., 2018, p. 371). The independent variables in this research are metric variables, and therefore, a MANOVA cannot be used.

Multiple Discriminant Analysis is also a dependence technique "*that addresses the situation of a nonmetric dependent variable"* (Hair et al., 2018, p. 471). Therefore, this technique can also not be used.

Logistic regression *"is a specialized form of regression that is formulated to predict and explain a binary (two-group) categorical variable rather than a metric-dependent measure"* (Hair et al., 2018, p. 548), this research does not have a categorical (two-group) DV, but the DV's are metric, and therefore, this method can also not be used.

Therefore, this research will continue with a multiple regression analysis (MRA), because this allows for testing the correlation of multiple independent variables. This study used two independent variables; intrinsic motives and extrinsic motives, which resulted from the factor analysis with principal axis factoring, but since the assumption of linearity is not met, the results should be interpreted carefully.

Multiple regression analysis

The regression analysis is performed for all eight dependent variables; total score creativity, total score originality, total score feasibility, total score effectiveness, top 1 creativity, top 1 originality, top 1 feasibility and top 1 effectiveness, but the focus of this research is on selecting a top three of creative ideas. Therefore, the focus in this chapter will be on the creativity scores. The other DV's are discussed in more detail in the appendix, which is presented in Appendix 5.

Multiple regression Creativity

This multiple regression analysis is executed with the DV 'Total score Creativity' which stands for selecting a top three of the most creative ideas.

The correlation matrix shows the correlation between the IV's and the DV totalscore_Creativity. r = 0,001 for intrinsic motives and r = -,078 for extrinsic motives. Therefore, it can be concluded there is no correlation between the DV totalscore_creativity and the IV's intrinsic motives and extrinsic motives.

R = 0,076 which is the strength of the relationship between all of the IV's and the DV totalscore_creativity, and 0,076 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,006 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,006 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

The significance of the ANOVA should be smaller than 0,05, sig. = 0,436 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the totalscore_creativity, which is the selection accuracy for selecting a top 3 of creative ideas, F(2,286) = 0,832, p = 0,436.

The coefficient table shows a significance level of p=0,894 (>0,05) for intrinsic motives and a significance level of p=0,198 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV totalscore_creativity. The B values show that when intrinsic motives go up with one unit, totalscore_creativity (the selection accuracy for selecting a top 3 creative ideas) goes up with 0,002 units, and when extrinsic motives go up with one unit, totalscore_creativity goes down with 0,016 units. Intrinsic motives influence the totalscore_creativity positively and extrinsic motives influence the totalscore_creativity negatively, but this is not significant, and therefore, does not mean anything.

Summarizing, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting

a top 3 of creative ideas. The results of the regression showed that the model explained only 0,6% of the variance and that the model is not a significant predictor of the selection accuracy of selecting a top three of creative ideas, $F(2,286) = 0,832$, $p = 0,436$. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Other findings

The multiple regression analysis was also carried out for only selecting a top 1 most creative idea, to see whether there is a correlation between this DV and the IV's. Nevertheless, this did not result in significant output, $F(2,286) = 0,052$, $p = 0,949$. Both intrinsic and extrinsic motives did not significantly contribute to the model.

It has also been tested whether originality, feasibility or effectiveness individually do have a correlation with intrinsic and extrinsic motives. Nevertheless, this did also not result in any significant output, thus, there is no correlation between selecting a top three of top one of most original, feasible or effective idea(s) and intrinsic or extrinsic motives, based on this study.

5. Conclusion and Discussion

This chapter will discuss the conclusion, in which the research question will be answered, and the discussion which will present the limitations of this study.

Conclusion

This chapter will focus on answering the research question, which is the following:

To what extent do the motives relate to selection accuracy of creative ideas in a context of co-creating sustainable innovations?

As mentioned before, resulting from the factor analysis, only two factors were extracted, which are two new factors. The hypotheses were based on four factors, which were formulated based on a literature review. The four factors from the hypothesis were 'intrinsic motives', 'knowledge motives', 'social motives' and 'financial motives'. The two new factors are named 'intrinsic motives' and 'extrinsic motives'. The new variable 'intrinsic motives' consist of items from knowledge motives and social motives and intrinsic motives. Hence, this is now a new variable. Formulating new factors has implications for answering the hypothesis, since the hypotheses are not about the new factors. Therefore, it is not possible to answer the hypothesis and it is not possible to accept or reject them.

Nevertheless, an answer to the research question will be formulated and discussed now, based on the two new IV's intrinsic motives and extrinsic motives. A regression analysis was executed to investigate the relation between intrinsic motives and selecting a top three of creative ideas. Creative ideas are ideas that are feasible, original and effective (Diehl and Stroebe, 1987; Hao et al., 2016). The regression analysis showed that only 0.6% of the variance is explained in the model, which is very low. Besides, the model is not significant and therefore, intrinsic and extrinsic motives are not a significant predictor for the selection accuracy of selecting a top three of creative ideas, $F(2,286) = 0,832$, $p = 0,436$. Concluding, bot intrinsic and extrinsic motives do not significantly contribute to the model.

As mentioned before, creativity consists out of feasibility, originality, and effectiveness. It has also been tested whether there are significant relations between these DV's and the IV's, but again this did not result in significant relations. Furthermore, selecting a top one of the most creative idea compared to selecting a top three of the most creative ideas have also been tested, to see if this makes a difference. Still, this did not result in significant relations.

Concluding, the answer on the research questions is therefore, based on this study, both intrinsic and extrinsic motives do not relate to selection accuracy of creative ideas in a context of co-creating sustainable innovations.

Discussion

This chapter will first discuss the interpretation of the results. Then, the theoretical and practical implications will be discussed. Thereafter, the limitations of this research will be presented. And lastly, recommendations for future research will be made.

Interpretation of the results

The results and the conclusion will now be interpreted. The conclusion is that both intrinsic and extrinsic motives do not relate to selection accuracy of creative ideas in a context of co-creating sustainable innovations. Because intrinsic and extrinsic motives did not have a significant relationship with selection accuracy. This entails that people's motives, intrinsic or extrinsic, for participating in co-creation, do not influence their capability of selecting a top three of the most creative ideas. Thus, people's motives are not important for who to select in the co-creation process, since, according to this study, this will not influence how well they perform at selecting sustainable ideas, and will therefore, not increase of decrease the selected ideas. Concluding, people's intrinsic and extrinsic motives do not influence the selection part for the co-creation process, based on this study. The theoretical and practical implications this conclusion has, will now be discussed.

Theoretical implications

The contribution to knowledge from this study is limited. No significant results were found and therefore, no relations between the IV's and the DV's was found. The contribution that has been made is the knowledge that based on this study, there are no relations between intrinsic and extrinsic motives and selection accuracy of creative ideas. This is not in line with what previous similar research had shown, which was presented in chapter two. This is therefore also interesting, because it is now important to investigate why this research had such a conflicting conclusion. It is possible this due to the fact that the items in the survey are based on the study by Fernandes and Remelhe (2016), but were slightly changed, for the scope of this research. This results in not having the guarantee of the reliability and validity of the survey questions, which was established by Fernandes and Remelhe (2016). The conclusion also has a practical implication, which will now be discussed.

Practical implications

This research concluded that intrinsic and extrinsic motives do not relate to the selection accuracy of selecting a top three of most creative ideas. For practice this implies that people's motives (intrinsic and extrinsic) do not influence their selection accuracy, and therefore, people's motives would not have to be considered when deciding who to include in the co-creation process. However, the many limitations of this study, which will be discussed next, make it questionable whether this is completely correct, and this practical implication should be considered with great consciousness. The practical implication of this study can be improved when all the limitations of this study are dealt with. The limitations will now be discussed.

Limitations

The sample of this study is not representative of the population, since there is an overrepresentation of people between the age category of 20 – 40 years old and there is an overrepresentation of people who have Havo or VWO year 4-6 or hbo bachelor or WO bachelor, or hbo master or WO master or doctor as their highest finished education. This is probably because convenience sampling is used to gather respondents for the survey. The researcher is within this age category and therefore, knows a lot of people who are also within this age category. Besides, this research is for a WO master, and therefore, the convenience sampling also led to reaching a lot of respondents who also have followed high educational programs. This results in the research not being generalizable to the population.

As mentioned before, this study asks participants about a hypothetical co-creation setting and is not conducted in an actual co-creation setting. Therefore, it could be hard for participants to know how they would really feel about participating co-creation. It was not possible in the scope of this research to test in an actual co-creation setting, and therefore, this solution was used, to still be able to investigate people's motives for participating in co-creation.

Another limitation of this study is that only two factors were extracted in the factor analysis. This entails that the hypothesis could not be answered, since different factors are used in the regression analysis.

The third limitation of this study relates to the ICC. An interclass correlation statistics test is used to measure the degree of dependence among individuals. As mentioned before, it was not possible to delete one or more sustainability ideas, to increase the reliability, since the ICC was performed after the survey was filled in by the respondents. When the ICC would have been tested before sending out the survey, it would have been possible to delete one or more ideas, which would have possibly increased the reliability of the study.

Fourth, the assumptions were checked before conducting a regression analysis. Nevertheless, this resulted in no linearity for all the DV's. Transforming the IV's and the DV's did not result in linearity either. For the sake of this research, a regression analysis was still performed, since there was no time to find other solutions and possible reasons for why there was no linearity, even after transforming the IV's and the DV's. Nevertheless, the assumption of linearity should have been met, for conducting the research correctly.

Finally, no significant results were found in this study. Therefore, no relationship is found between the IV's and the DV's. Nevertheless, a relationship was expected from the literature review. It is remarkable that literature does find relations between intrinsic and extrinsic motives and this study does not. This may be due to the fact that the items to test the IV's had to be adjusted for the scope of this research. Therefore, they are not completely in line with what previous research has done, and this could have resulted in extracting different variables in the factor analysis and having no significant relations in the regression analysis.

All the above limitations should be taken into account when looking at this study and in future research which is about the relationship of motives and selection accuracy. The limitations also have consequences for the practical and theoretical implications, which will now be discussed. The next and last part of this chapter discusses recommendations for future research.

Future research

Future research should aim to have a more representative sample, since this research was not representative for the education and the age of the population. When the sample is more representative, the research can be generalized to the whole population (Hair et al., 2018), and then the research would represent a bigger scope.

The DV's intrinsic motives, knowledge motives, social motives and financial motives are eventually not tested, future research should aim to test these original variables, to test if there is a relationship between these motives and selection accuracy, to still be able to improve the selection accuracy within co-creation in a sustainable setting. To be able to do this, it has to be inspected why the factor analysis resulted in different variables then what was expected out of literature.

The motives were now tested via a survey, perhaps when testing the motives via another technique, like an experiment or via field research, this would result in better outcomes. It could be the case that the respondents are not completely aware of which motives they would have for participating in co-creation, and therefore, it could be difficult to answer the questions from

the survey. The survey focussed on a ‘what if situation’. The question was ‘what if you would participate in co-creation’. Perhaps it would be better to measure people’s motives for co-creation in an actual setting of co-creation. This should be investigated in future research, to know if this is true and whether this would help to improve the research.

As mentioned before, the ICC was performed after conducting the survey, nevertheless, this should have been done before sending out the survey. In future research this should be done, to be able to see whether this would result in significant output.

Lastly, it should be investigated why there was no linearity for any of the DV’s. Because of the limited time and capacity of this study, this has not been investigated yet, nevertheless, it is essential to understand why this is the case, to be able to improve the linearity in future research.

These recommendations for future research close this master thesis.

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Appendix 1 Sustainable ideas

Idea	Description
1. Turning origami paper wrapping into art	Products are wrapped in origami paper. This packaging contains varying instructions to fold an origami figure from the packaging, for example, a crane, frog, or lotus flower. This way, waste is turned into art, so that the paper can be used longer.
2. Packaging as a measuring instrument	The packaging can also be used as a scale with sensors that send small electric pulses through the product you place on it. Because different nutrients (e.g., fats, carbohydrates, proteins) conduct electricity differently, a nutritional score can be calculated that determines how healthy the product is.
3. Sustainable grocery shopping nets	To reduce the use of plastic bags in supermarkets, they are being removed from all over the store. Instead, consumers buy reusable, sustainable nets in which, for example, loose vegetables, fruits, or bread can be packed. The consumer will take these bags with them again next time.
4. No packaging if not necessary	Many products are sold in packaging while this packaging is not necessary. By removing this packaging, the packaging material is saved. Examples of products that can be sold without packaging are shoes without a box or sandwiches to-go without packaging.
5. Customized packaging	The packaging machine scans the dimensions of the ordered products (this works for one or more products at the same time) and folds one cardboard box around it. As a result, the packaging is smaller, less packaging material is needed, and the packaging contains as little empty air as possible so that filling material is not necessary.
6. Merging orders	There is a parcel locker in every neighbourhood where residents can collect their orders. All orders placed at the same store are placed in one reusable crate. This crate is used by the parcel deliverer to deliver the products to the parcel locker. The crate is then taken back and reused.

7. Edible or solvable packaging	These are products that are packaged in materials that are edible or dissolve when used so that no residual waste remains. For example, think of coffee cups made of biscuits and chocolate, which you can eat after drinking the coffee, or soap capsules made of seaweed that dissolve in the shower.
8. Plants from packaging material	The products are packed in degradable paper containing seeds. After the product has been unpacked, the paper can be moistened, after which it can be planted in the ground. Make sure to provide enough water to keep the paper moist. After a while, the paper dissolves, and plants grow where the paper is planted.
9. Feathers as insulating packaging	There is an enormous surplus of feathers in the poultry industry. An important characteristic of feathers is that they are strong, light, and insulating. That is why feathers are very suitable for keeping cooled food at the right temperature. Instead of delivering products in Styrofoam cooler boxes, packaging made from feathers can be used.
10. Bring your own packaging	The products are offered without packaging and the consumer takes their own packaging from home to put the products in. Think, for example, of pasta, cereals, and spreads that you put in your own jar in the supermarket, coffee-to-go in your own mug, and your takeaway order at a restaurant in your own container.
11. Use more sustainable materials	Most packaging is made of paper or oil-based plastic. However, more alternatives are possible. Think of packaging made from renewable raw materials (e.g., sugar cane, bamboo, fungi), bio-waste (e.g., fruit peels, eggshells), or residual products from production (e.g., tall oil, fibers).
12. Returning a deposit at the train station	A deposit is requested on small plastic bottles and cans. To encourage people to recycle these bottles/cans instead of throwing them away, they can be handed in at the deposit machines at train stations. Consumers get the deposit back by scanning a QR code with which the money is deposited directly into their account.

Appendix 2 Sample

2.1 Information about the sample

17.407.585 people in total in the Netherlands in 2020 (these are the most recent numbers from CBS)

8 648 031 = 49,6796712% male

8 759 554 = 50,3203288% female

Gender

Variable	Population (CBS)	Sample (Survey)
Male	49,68%	48,4%
Female	50,32%	48,4%
Other	X	2,8%

Resource: Mannen en vrouwen. (z.d.).

The CBS does not take 'other' categories then 'male' and 'female' into account, but in this study there was also the possibility to select the category 'other', which 2,8% of the respondents has selected. Since this cannot be compared with the scores of the population, this category will not be taken into account for this analysis and will be considered as missing data. This entails that 97,8% is the total percentage that is left in the equation, and exactly 50% of this group selected 'male' and 50% selected 'female'. The rounded numbers of the population also result in 50% male and 50% female, and therefore it can be stated that the sample represents the population distribution of 'gender'. This is also proven in the analysis below.

What is your gender? - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	140	48,4	48,6	48,6
	Female	140	48,4	48,6	97,2
	I identify myself as	2	,7	,7	97,9
	I prefer not to say	6	2,1	2,1	100,0
	Total	288	99,7	100,0	
Missing	System	1	,3		
Total		289	100,0		

‘Other’ is a missing group, since the CBS does not take this into account. Therefore, the groups 3 and 4 are now selected as missing.

Frequencies

What is your gender? - Selected Choice

	Observed N	Expected N	Residual
Male	140	139,1	,9
Female	140	140,9	-,9
Total	280		

Test Statistics

	What is your gender? - Selected Choice
Chi-Square	,011[a]
df	1
Asymp. Sig.	,915

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 139,1.

The critical value with 1 degrees of freedom with an alpha of 0,05 is 3,84. The chi-square value is 0,011 which is smaller than 3,84. The significance level is 0,915 which is bigger then 0,05 and therefore accepted. Therefore, H0 is accepted, which entails that the sample size is representative for the gender of the population.

Education

Variable	Population (CBS)	Sample (Survey)
Primary school	8,7%	0%
VMBO (high school) MBO 1	11,13%	2,8%
Have or VWO year 1-3 (high school)	8,45%	0,7%
Havo or VWO year 4-6 (high school)	9,35%	12,3%
MBO 2, 3, 4	26,48%	12,3%
HBO bachelor or WO bachelor	21,47%	41,8%
HBO master or WO master Doctor	12,72%	30,2%

Resource: Bevolking; onderwijsniveau en migratieachtergrond 2003–2021. (2021, 16 november).

Recode education to the CBS categories

There are more expected frequencies than sample frequencies because the first category (primary school) had a value of 0 in the sample group, therefore it was not possible to include it in the spss program. This category is therefore deleted from the analysis, so the other categories could be tested for representativeness. A chi-square test was deducted to test this.

Education CBS

	Observed N	Expected N	Residual
VMBO or MBO 1	8	35,4	-27,4
Havo or VWO year 1-3	2	26,9	-24,9
havo or VWO year 4-6	35	29,7	5,3
MBO 2, 3, or 4	35	84,2	-49,2
hbo bachelor or WO bachelor	119	68,3	50,7
hbo master or WO master or doctor	86	40,5	45,5
Total	285		

Test Statistics

	Education CBS
Chi-Square	162,849[a]
df	5
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 26,9.

The chi-square has a p value of 0,000 which is smaller than the critical p value (0,3) and therefore H0 is rejected. This entails that the sample size is not representative for the population for the category ‘education’.

What is your highest completed educational level? - Selected Choice

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	vmbo (high school)	5	1,7	1,8	1,8
	mbo1	3	1,0	1,1	2,8
	havo or vwo year 1-3 (high school)	2	,7	,7	3,5
	havo or vwo year 4-6 (high school)	35	12,1	12,3	15,8
	mbo2, mbo3, or mbo4	35	12,1	12,3	28,1
	hbo bachelor or wo bachelor	119	41,2	41,8	69,8
	hbo master or wo master	76	26,3	26,7	96,5
	doctor	10	3,5	3,5	100,0
	Total	285	98,6	100,0	
Missing	Don't know or unknown	1	,3		
	System	3	1,0		
	Total	4	1,4		
Total		289	100,0		

Frequencies

Statistics

Education_CBS

N	Valid	285
	Missing	4

Education_CBS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VMBO or MBO 1	8	2,8	2,8	2,8
	Havo or VWO year 1-3	2	,7	,7	3,5
	havo or VWO year 4-6	35	12,1	12,3	15,8
	MBO 2, 3, or 4	35	12,1	12,3	28,1
	hbo bachelor or WO bachelor	119	41,2	41,8	69,8
	hbo master or WO master or doctor	86	29,8	30,2	100,0
	Total	285	98,6	100,0	
Missing	don't know	1	,3		
	System	3	1,0		
	Total	4	1,4		
Total		289	100,0		

Respondent 287 filled in post HBO, which is the same as an HBO master, therefore this is changed in the data set, to match the created categories.

Education CBS

	Observed N	Expected N	Residual
VMBO or MBO 1	8	35,4	-27,4
Havo or VWO year 1-3	2	26,9	-24,9
havo or VWO year 4-6	35	29,7	5,3
MBO 2, 3, or 4	35	84,2	-49,2
hbo bachelor or WO bachelor	118	68,3	49,7
hbo master or WO master or doctor	87	40,5	46,5
Total	285		

Test Statistics

	Education CBS
Chi-Square	163,654[a]
df	5
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 26,9.

The sample values are compared to the population values, which results in the above output. The chi-square value is significant (0,000). The frequency table shows that VMBO or MBO1, Havo or VWO year 1-3, MBO 2, 3 or 4 are all underrepresented. Havo or VWO year 4-6 is slightly overrepresented, and hbo bachelor or WO bachelor and hbo master or WO master or doctor are overrepresented in the sample group.

Age

Variable	Population (CBS)	Sample (survey)
0-20	21%	0,7%
20-40	25%	66,6%
40-65	34%	28,6%
65-80	15%	3,1%
80 +	5%	1,0 %

Resource: Leeftijdsverdeling. (z.d.).

Chi-Square Test

Frequencies

Age_categories

	Observed N	Expected N	Residual
0-20	2	60,3	-58,3
20-40	191	71,8	119,3
40-65	82	97,6	-15,6
65-80	9	43,1	-34,0
80 +	3	14,4	-11,4
Total	287		

Test Statistics

	Age_categories
Chi-Square	292,929[a]
df	4
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 14,4.

A chi2 test has been deducted. The p value (0.000) that is found is smaller than the critical p value (alpha of 0.3) of Chi-square and therefore significantly different, and therefore H0 is rejected. This entails that the sample is not representative for the population.

Age_categories		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-20	2	,7	,7	,7
	20-40	191	66,1	66,6	67,2
	40-65	82	28,4	28,6	95,8
	65-80	9	3,1	3,1	99,0
	80 +	3	1,0	1,0	100,0
	Total	287	99,3	100,0	
Missing	System	2	,7		
Total		289	100,0		

Our sample starts with people of 18 years and older, therefore the group of 0-18 is not considered in this study and this should be taken into account when calculating representativeness.

There are 437.000 people in total of 18 and 19 years old in 2020 in the Netherlands. This is also changed in the data set (the label of the first group is now 18-20).

Category group	Absolute number 2020	New population study	Percentage
0-17	3.219.100	-	-
18-20	437.000	437.000	3,079%
20-40	4.352.500	4.352.500	30,671%
40-65	5.919.400	5.919.400	41,713%
65-80	2.611.500	2.611.500	18,403%
80+	870.500	870.500	6,134%
Total population 2020	17.410.000	14.190.900	100%

This results in the following data

Frequencies

Age_categories

	Observed N	Expected N	Residual
18-20	2	8,8	-6,8
20-40	191	88,0	103,0
40-65	82	119,7	-37,7
65-80	9	52,8	-43,8
80 +	3	17,6	-14,6
Total	287		

Test Statistics

	Age_categories
Chi-Square	186,099[a]
df	4
Asymp. Sig.	,000

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 8,8.

Chi-square is significant, p = 0,000 (smaller then 0,3 with alpha of 0,05) and therefore, H0 is rejected, and the sample size is not representative of the population for the category ‘age’. The group between 20-40 is overrepresented and the other groups are underrepresented.

Appendix 3 Factor Analysis

Reliability test before FA:

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,777	,791	9

Cronbach's alpha total model

Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Intrinsic_1	Knowledge_1	Social_1	Financial_1
Intrinsic_2	Knowledge_2	Social_2	
Intrinsic_3		Social_3	

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,705	,705	3

Reliability factor 1 Intrinsic motives

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,795	,795	2

Reliability factor 2 Knowledge motives

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,567	,564	3

Reliability factor 3 Social motives

Factor analysis:

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,822
Bartlett's Test of Sphericity	Approx. Chi-Square	933,126
	df	36
	Sig.	,000

Table KMO and Bartlett's Test

Communalities

	Initial	Extraction
I would be more willing to participate in co-creation because I am curious	,297	,243
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,427	,400
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,620	,741
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,581	,622
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,560	,621

I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,405	,443
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,395	,401
I would be more willing to participate in co-creation because I would like to gain social status	,279	,505
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation	,208	,317

Extraction Method: Principal Axis Factoring.

Table 3.1: Communalities Principal Axis Factoring

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,818	42,427	42,427	3,354	37,269	37,269
2	1,494	16,596	59,024	,939	10,430	47,698
3	,914	10,150	69,174			
4	,643	7,140	76,314			
5	,618	6,870	83,184			
6	,516	5,731	88,915			
7	,403	4,480	93,395			
8	,333	3,697	97,093			
9	,262	2,907	100,000			

Extraction Method: Principal Axis Factoring.

Table 3.2: Total Variance Explained

Factor Matrix[a]

Factor	
1	2

I would be more willing to participate in co-creation because I am curious	,479	
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,630	
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,798	-,324
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,786	
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,787	
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,613	
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,627	
I would be more willing to participate in co-creation because I would like to gain social status		,652
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation		,558

Extraction Method: Principal Axis Factoring.

a. 2 factors extracted. 15 iterations required.

Table 3.3: Factor Matrix

Varimax rotation

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,822
Bartlett's Test of Sphericity	Approx. Chi-Square	933,126
	df	36
	Sig.	,000

Table 3.4: Varimax rotation, KMO and Bartlett's test

Communalities

	Initial	Extraction
I would be more willing to participate in co-creation because I am curious	,297	,243
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,427	,400
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,620	,741
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,581	,622

I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,560	,621
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,405	,443
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,395	,401
I would be more willing to participate in co-creation because I would like to gain social status	,279	,505
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation	,208	,317

Extraction Method: Principal Axis Factoring.

Table 3.5: Varimax rotation, communalities

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,818	42,427	42,427	3,354	37,269	37,269	3,338	37,084	37,084
2	1,494	16,596	59,024	,939	10,430	47,698	,955	10,614	47,698
3	,914	10,150	69,174						
4	,643	7,140	76,314						
5	,618	6,870	83,184						
6	,516	5,731	88,915						
7	,403	4,480	93,395						
8	,333	3,697	97,093						
9	,262	2,907	100,000						

Extraction Method: Principal Axis Factoring.

Table 3.6: Varimax rotation, total variance explained

Rotated Factor Matrix[a]

	Factor	
	1	2
I would be more willing to participate in co-creation because I am curious	,467	
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,624	
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,822	
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,789	
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,787	
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,589	,309
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,632	
I would be more willing to participate in co-creation because I would like to gain social status		,673

I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation		,550

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Table 3.7: Varimax rotation, rotated factor matrix

Factor 1	**Factor 2**
Intrinsic_1 Intrinsic_2 Intrinsic_3 Knowledge_1 Knowledge_2 Social_1 Social_2	Social_3 Financial_1

Table 3.8: Item loadings two factor solution

Reliability test

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,849	,851	7

Reliability factor 1

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,531	,535	2

Reliability factor 2

Principal axis factoring with 4 fixed numbers

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,822
Bartlett's Test of Sphericity	Approx. Chi-Square	933,126
	df	36
	Sig.	,000

Table 3.9: principal axis factoring, four fixed number

Communalities

	Initial	Extraction
I would be more willing to participate in co-creation because I am curious	,297	,487
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,427	,581
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,620	,938
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,581	,650
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,560	,653
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,405	,529

I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,395	,408
I would be more willing to participate in co-creation because I would like to gain social status	,279	,730
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation	,208	,249

Extraction Method: Principal Axis Factoring.

Table 3.10: princiap axis factoring, four fixed numbers

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,818	42,427	42,427	3,458	38,424	38,424
2	1,494	16,596	59,024	1,063	11,815	50,239
3	,914	10,150	69,174	,456	5,071	55,310
4	,643	7,140	76,314	,248	2,752	58,061
5	,618	6,870	83,184			
6	,516	5,731	88,915			
7	,403	4,480	93,395			
8	,333	3,697	97,093			
9	,262	2,907	100,000			

Extraction Method: Principal Axis Factoring.

Table 3.11: principal axis factoring, four fixed numbers

Factor Matrix[a]

	Factor			
	1	2	3	4
I would be more willing to participate in co-creation because I am curious	,508		,460	

I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,657		,381	
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,831	-,378		,307
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,779			
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,781			
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,618			
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,619			
I would be more willing to participate in co-creation because I would like to gain social status		,758		
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation		,491		

Extraction Method: Principal Axis Factoring.

a. Attempted to extract 4 factors. More than 25 iterations required. (Convergence=,008). Extraction was terminated.

Table 3.12: principal axis factoring, four fixed factors

Rotation Principal axis factoring with four fixed numbers

Communalities

	Initial	Extraction
I would be more willing to participate in co-creation because I am curious	,297	,487
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	,427	,581
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,620	,938
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,581	,650
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,560	,653
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,405	,529
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,395	,408

I would be more willing to participate in co-creation because I would like to gain social status	,279	,730
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation	,208	,249

Extraction Method: Principal Axis Factoring.

Table 3.13: rotation, four fixed factors

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,818	42,427	42,427	3,458	38,424	38,424	1,720	19,108	19,108
2	1,494	16,596	59,024	1,063	11,815	50,239	1,338	14,869	33,977
3	,914	10,150	69,174	,456	5,071	55,310	1,175	13,061	47,038
4	,643	7,140	76,314	,248	2,752	58,061	,992	11,024	58,061
5	,618	6,870	83,184						
6	,516	5,731	88,915						
7	,403	4,480	93,395						
8	,333	3,697	97,093						
9	,262	2,907	100,000						

Extraction Method: Principal Axis Factoring.

Table 3.14: rotation, four fixed numbers

Rotated Factor Matrix[a]

	Factor			
	1	2	3	4
I would be more willing to participate in co-creation because I am curious			,660	
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas			,657	
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	,370	,830		

I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	,649	,406		
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	,667	,373		
I would be more willing to participate in co-creation because I would like to get in touch with the researchers	,639			
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	,389	,462		
I would be more willing to participate in co-creation because I would like to gain social status				,818
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation				,468

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 6 iterations.

Table 3.15: rotation, four fixed numbers

Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Knowledge_1 Knowledge_2 Social_1	Intrinsic_3 Social_2	Intrinsic_1 Intrinsic_2	Social_3 Financial_1

Table 3.16: Item loadings four factor solution

Reliability test

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,790	,794	3

Reliability factor 1

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,736	,736	2

Reliability factor 2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,681	,681	2

Reliability factor 3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,531	,535	2

Reliability factor 4

Recode into 2 IV's

Now the new factors should be recoded in the SPSS output file, so all the items load on the 2 new factors. This entails that from now on there will only be two independent variables (intrinsic motives and extrinsic motives) instead of the four IV's that were selected from literature.

Two new variables were created ‘Intrisic_new’ and ‘Extrinsic_new’.

Reliability test for factor 1

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,849	,851	7

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	4,857	3,471	5,298	1,827	1,526	,439	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I would be more willing to participate in co-creation because I am curious	28,73	39,217	,451	,291	,850
I would be more willing to participate in co-creation because I enjoy keeping up with new innovations and new ideas	28,70	37,253	,595	,423	,831
I would be more willing to participate in co-creation because I like to support innovative ideas that contribute to a more sustainable world	28,73	35,769	,695	,599	,816
I would be more willing to participate in co-creation because I would like to improve the idea evaluation / selection of sustainable innovation	29,34	34,594	,717	,577	,812
I would be more willing to participate in co-creation because I would like to gain more knowledge about sustainable innovations	29,18	34,623	,715	,557	,812

I would be more willing to participate in co-creation because I would like to get in touch with the researchers	30,53	35,799	,539	,357	,841
I would be more willing to participate in co-creation because I believe in the norms and values for sustainable development	28,77	37,797	,569	,383	,834

Reliability test for factor 2

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,531	,535	2

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3,147	2,744	3,550	,806	1,294	,325	2

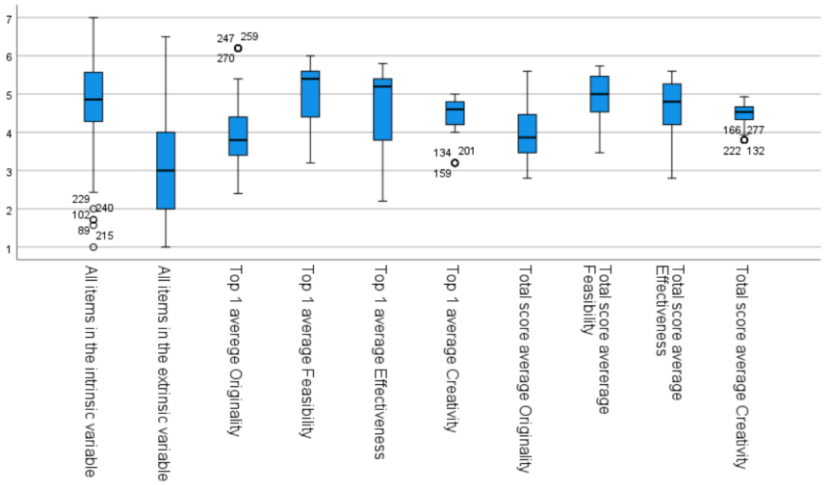
Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
I would be more willing to participate in co-creation because I would like to gain social status	3,55	2,818	,365	,133	.
I would be more willing to participate in co-creation I because I would like to gain a financial reward for participation	2,74	2,101	,365	,133	.

The Cronbach's alpha is 0,849 for factor 1 and 0,531 for factor two. Both are above the critical value of 0,5. The desirable value is above 0,7 which is the case for factor 1 but not for factor 2. This entails that factor 1 is reliable and factor 2 is somewhat reliable (but not a lot). The Cronbach's alpha does not get better when an item is deleted, it somewhat stays the same when intrinsic_1 is deleted and gets lower when other items in factor 1 are deleted. For factor 2 this cannot be tested, because there are only two items in this factor.

Appendix 4 Assumptions checking

- Outliers checking



Graphs → dialogs → boxplot → simple & summaries of separate variables → put in the variables you need (in boxes represent) and then 'OK'

First the outliers are checked for the IV's (intrinsic and extrinsic motives) and for the DV's (Top1_originality, Top1_feasibility, Top1_effectiveness, Top1_creativity, Totalscore_originality, Totalscore_feasibility, Totalscore_effectiveness, Totalscore_creativity). A boxplot was plotted to see if there are any substantial outliers. This results in no substantial outliers, which entails no respondents have to be deleted.

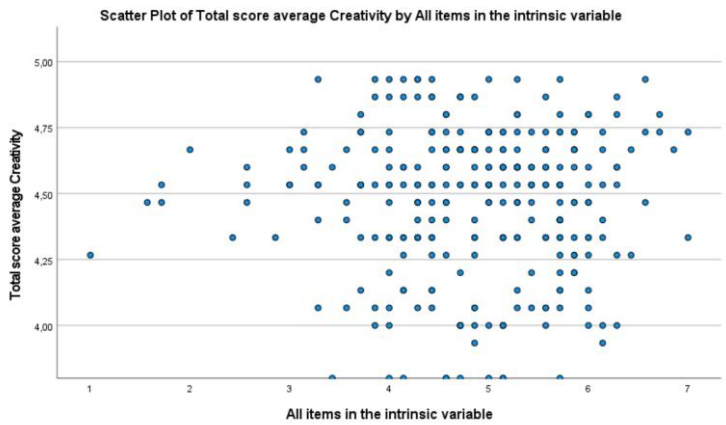
After this, the assumptions for regression analysis were checked.

- Linearity

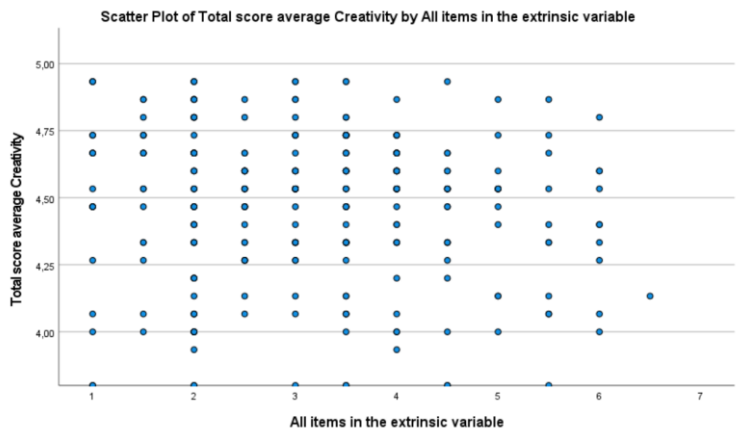
A scatterplot is drawn to test linearity. The linearity is tested for both IV's and for all eight the DV's.

Total score linearity

Scatterplot for linearity for the IV intrinsic motives and for the DV total score creativity:

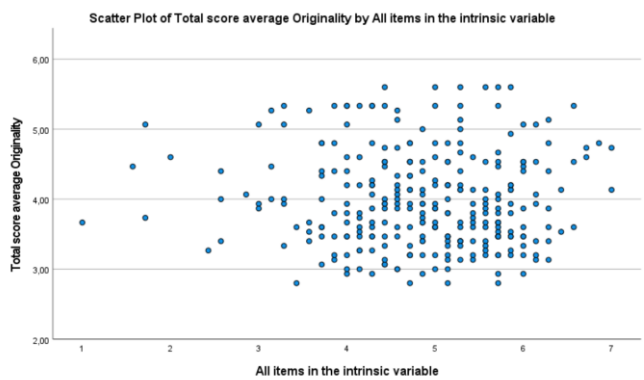


Scatterplot for linearity for the IV extrinsic motives and for the DV total score creativity:

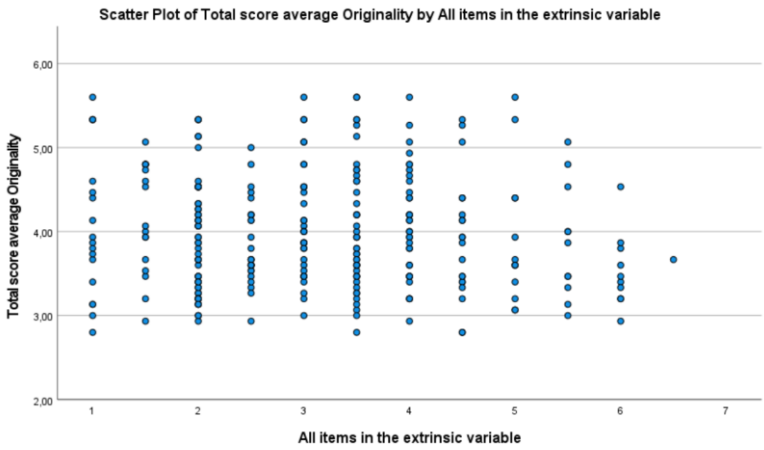


The scatterplots show that for total score creativity the plot is not linear for the IV intrinsic motives, and also not linear for the IV extrinsic motives.

Scatterplot for linearity for the IV intrinsic motives and for the DV total score originality:

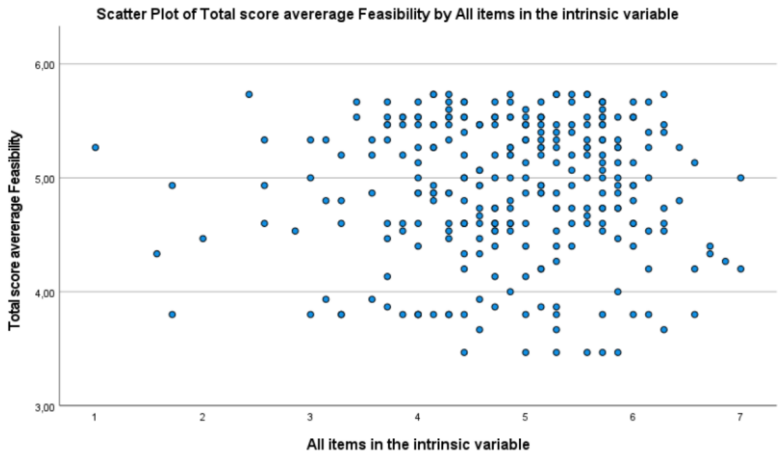


Scatterplot for linearity for the IV extrinsic motives and for the DV total score originality:

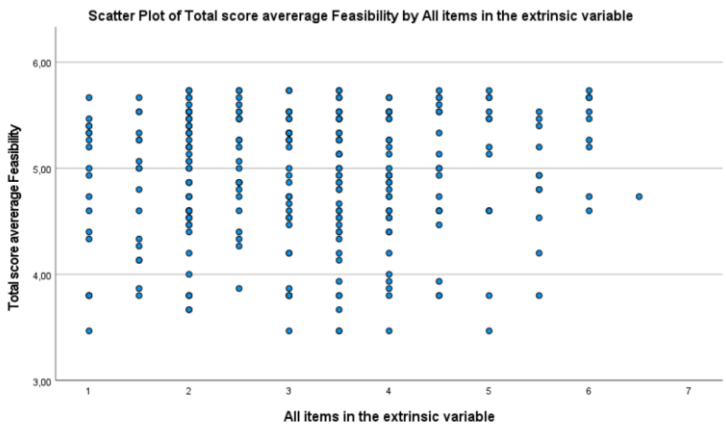


The scatterplots for the DV total score originality also show a not linear relationship for the IV intrinsic motives, and also not linear relationship for the IV extrinsic motives.

Scatterplot for linearity for the IV intrinsic motives and for the DV total score feasibility:

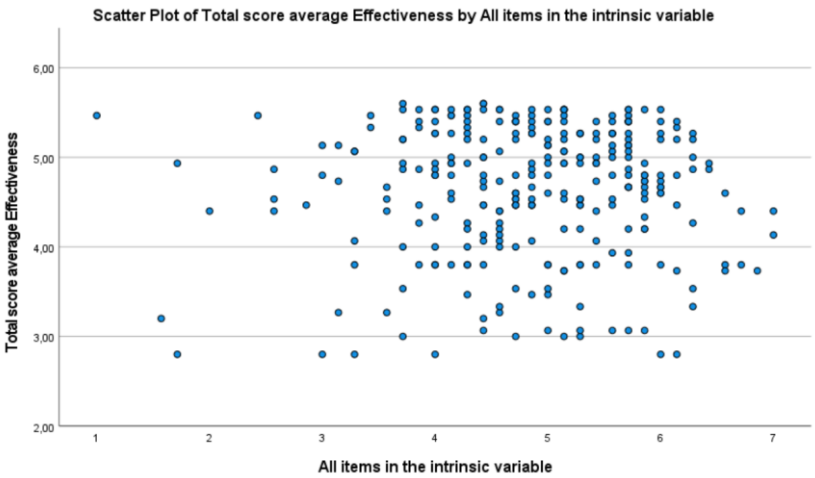


Scatterplot for linearity for the IV extrinsic motives and for the DV total score feasibility:

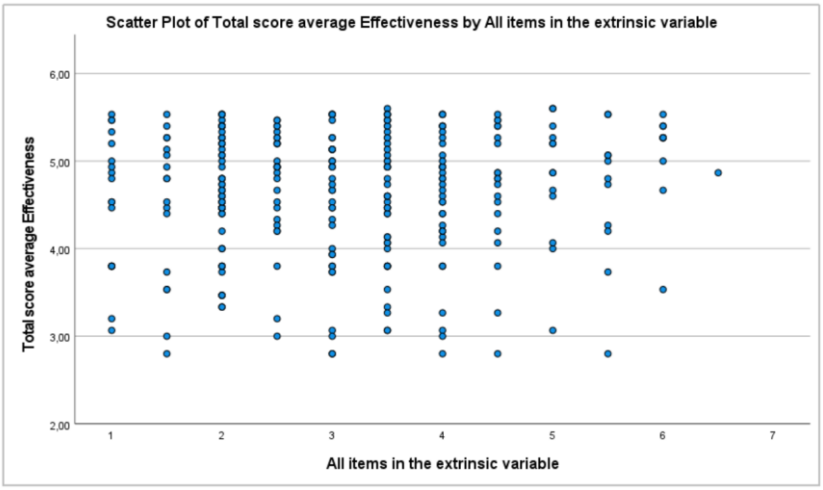


The scatterplots for the DV total score feasibility also show a not linear relationship for the IV intrinsic motives, and also not linear relationship for the IV extrinsic motives.

Scatterplot for linearity for the IV intrinsic motives and for the DV total score effectiveness:



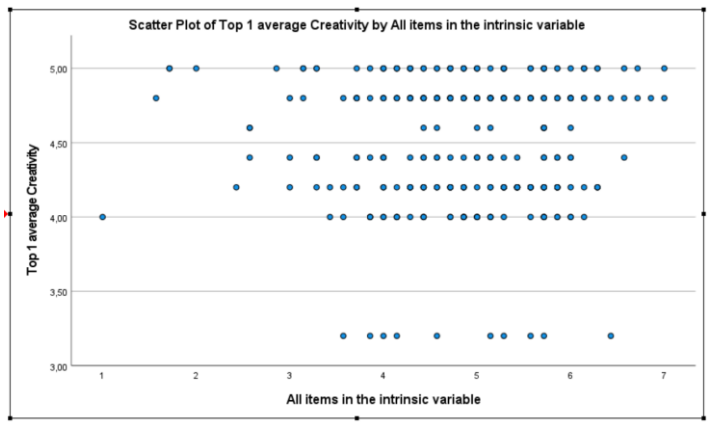
Scatterplot for linearity for the IV extrinsic motives and for the DV total score effectiveness:



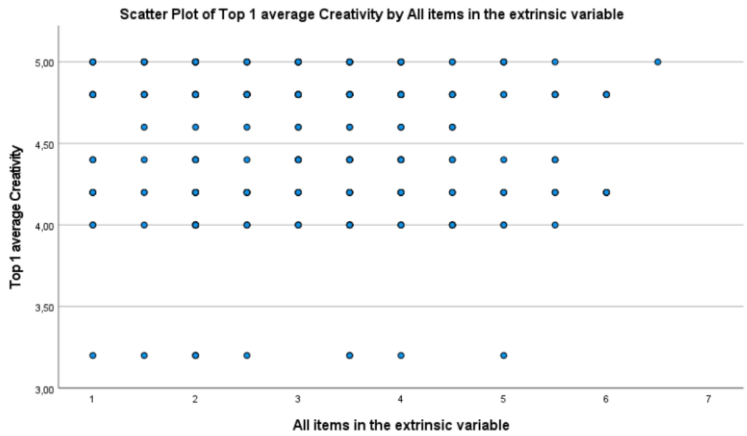
The scatterplots for the DV total score effectiveness also show a not linear relationship for the IV intrinsic motives, and also not linear relationship for the IV extrinsic motives.

Top 1 linearity

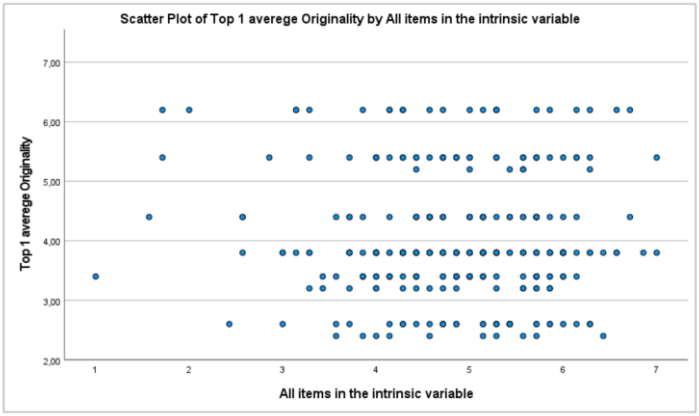
Scatterplot for linearity for the IV intrinsic motives and for the DV Top1_Ave_Creativity:



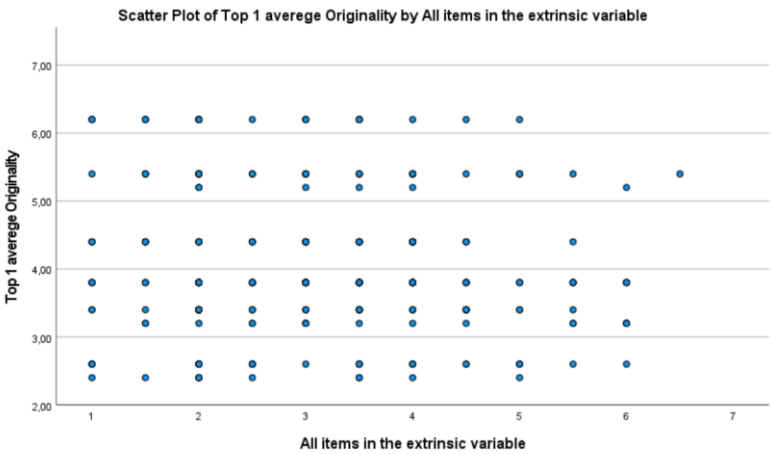
Scatterplot for linearity for the IV extrinsic motives and for the DV Top1_Ave_Creativity:



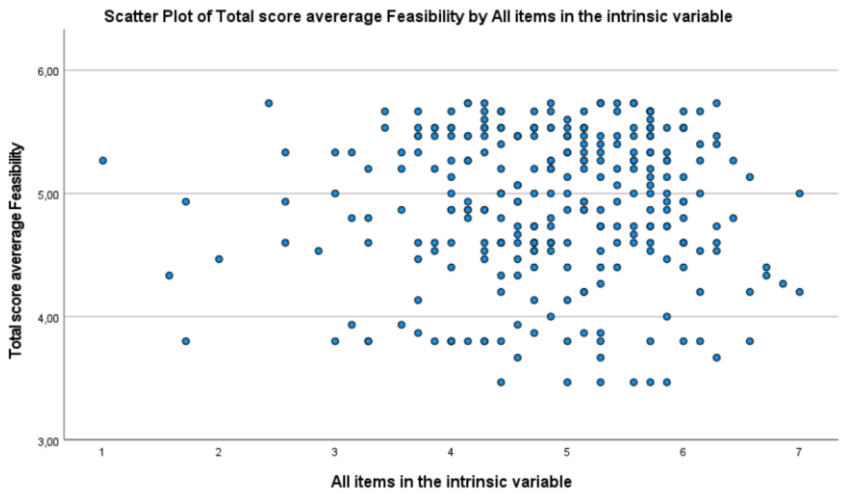
Scatterplot for linearity for the IV intrinsic motives and for the DV Top1_Ave_Originality:



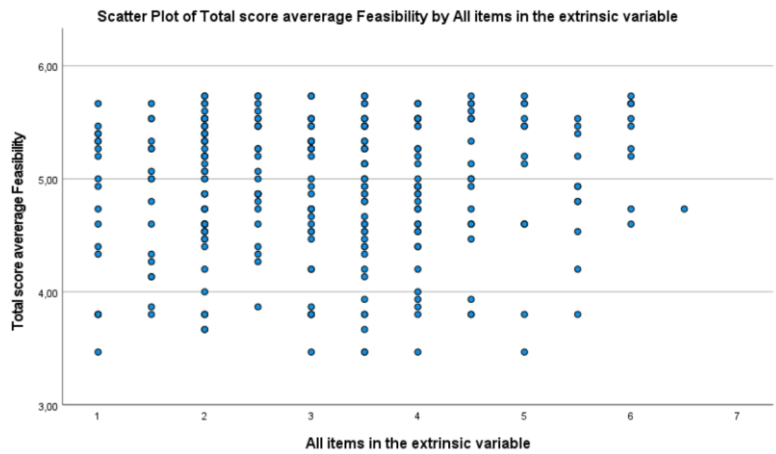
Scatterplot for linearity for the IV extrinsic motives and for the DV Top1_Ave_Originality:



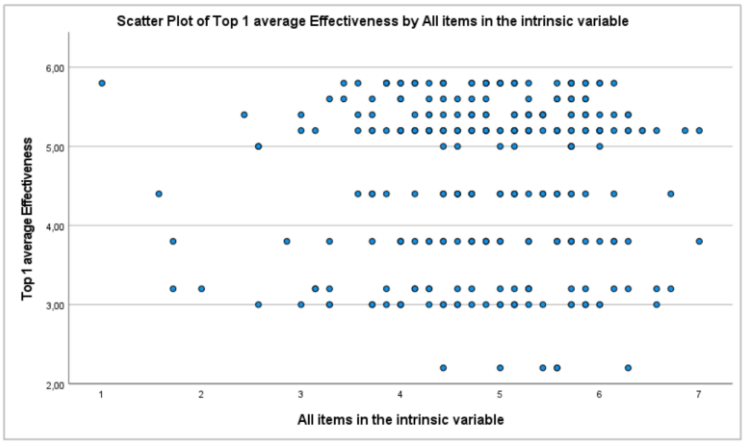
Scatterplot for linearity for the IV intrinsic motives and for the DV Top1_Ave_Feasibility:



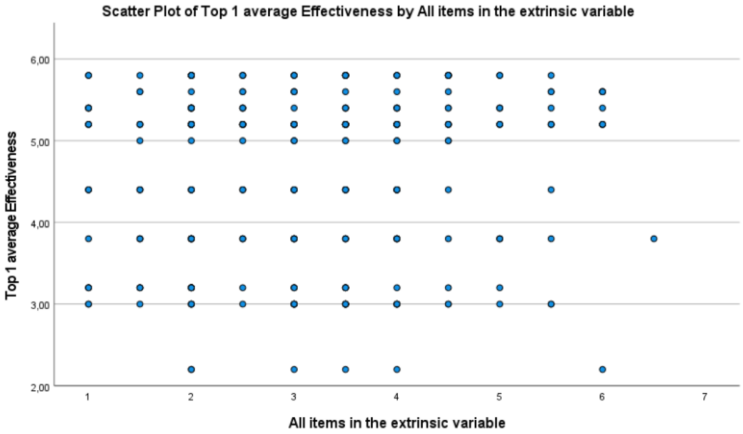
Scatterplot for linearity for the IV extrinsic motives and for the DV Top1_Ave_Feasibility:



Scatterplot for linearity for the IV intrinsic motives and for the DV Top1_Ave_Effectiveness:



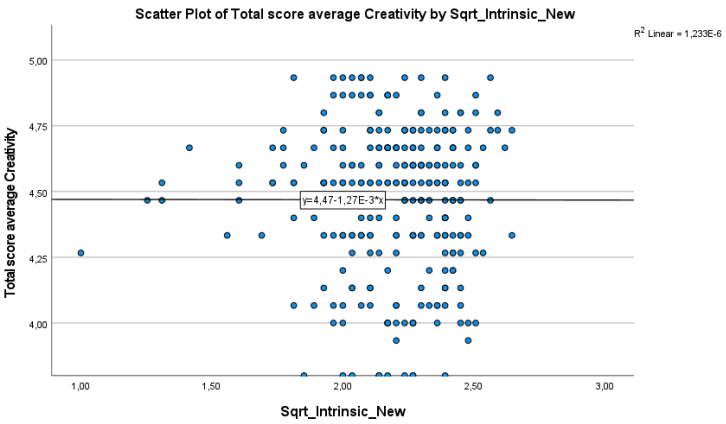
Scatterplot for linearity for the IV extrinsic motives and for the DV Top1_Ave_Effectiveness:



The scatterplots for the Top 1 scores show for all the IV and DV combinations that there is no linear relationship.

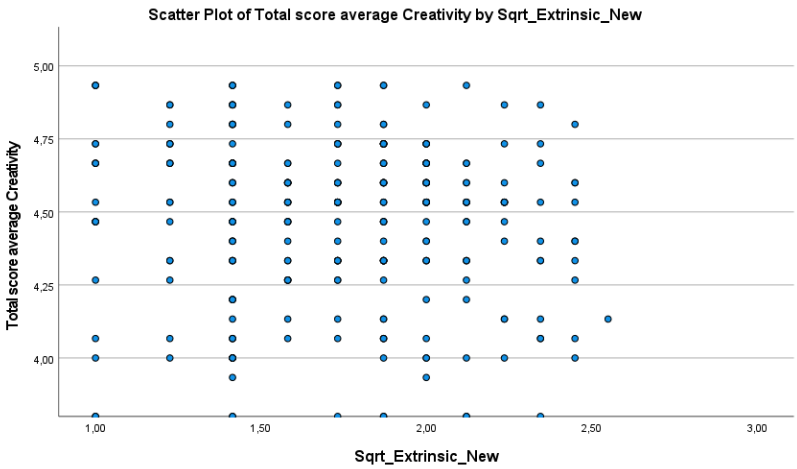
Since there are no linear relationships between the IV's and the DV's, the data is transformed of logarithms, square roots and inverse.

Square root for intrinsic motives and DV Totalscore_creativity

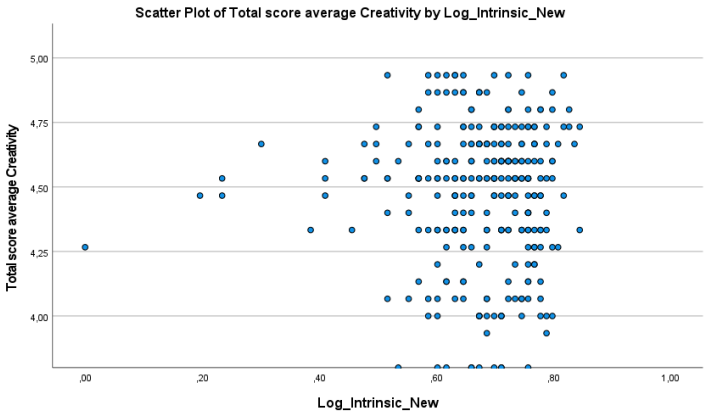


This still results in a non-linear relationship.

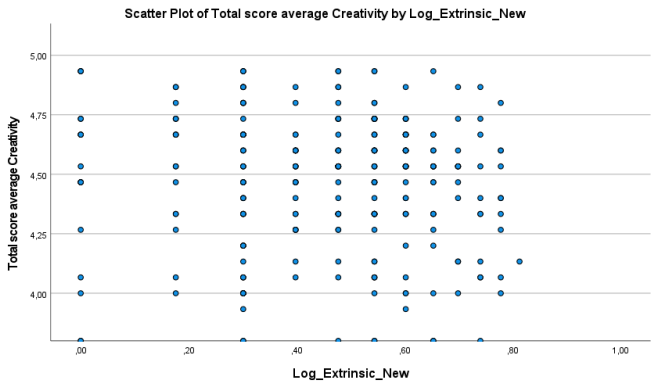
The same square root variable is created for Extrinsic motives. This results in the following scatterplot for the IV totalscore_creativity:



This also still results in a non-linear relationship. Therefore, it is tested if the data is transformed into logarithms, if the data is then linear. This is done for the DV totalscore_creativity (since this is the DV which this research is most interested in:

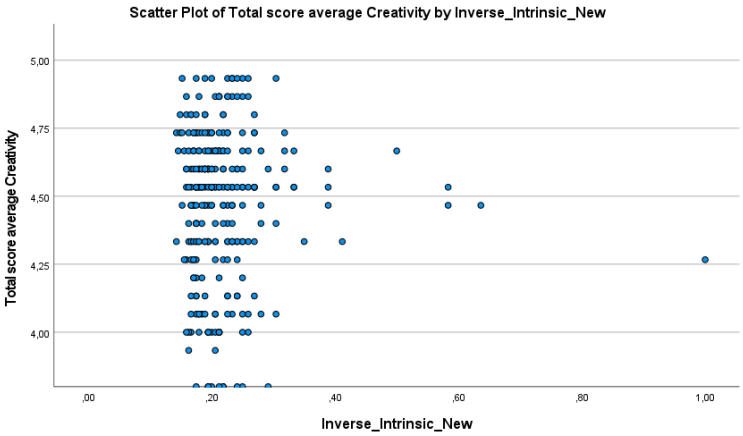


For Log_extrinsic_new and Totalscore_creativity:

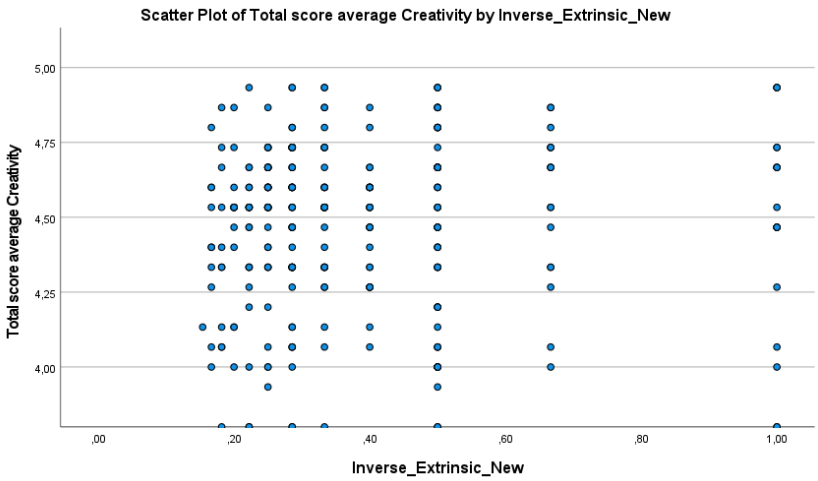


Both still result in a non-linear relationship. Therefore, the original IV's are now transformed into inverses.

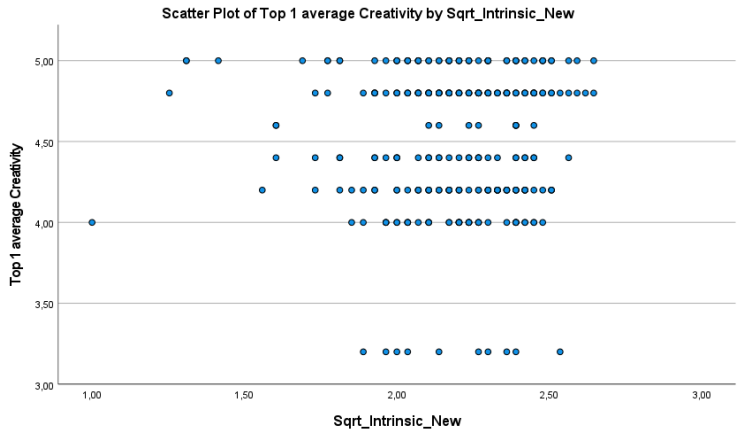
This is again done for the IV intrinsic motive (Inverse_intrinsic_new) and DV totalscore_creativity:



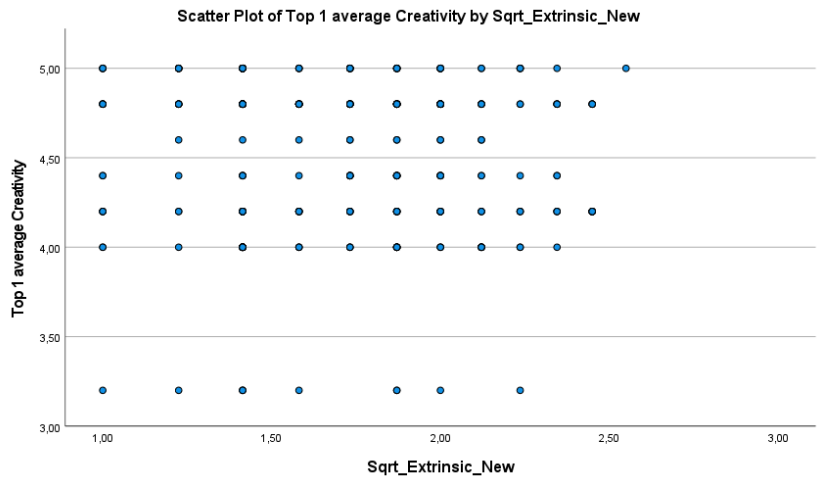
This is again done for the IV extrinsic motive (Inverse_extrinsic_new) and DV totalscore_creativity:



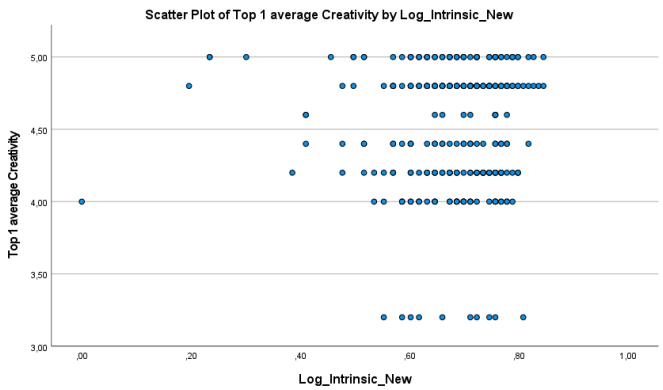
Top 1
The same transformations are performed for only the top 1 selection, to see if there is a difference between these IV's.
Square root intrinsic and DV top1_creativity:



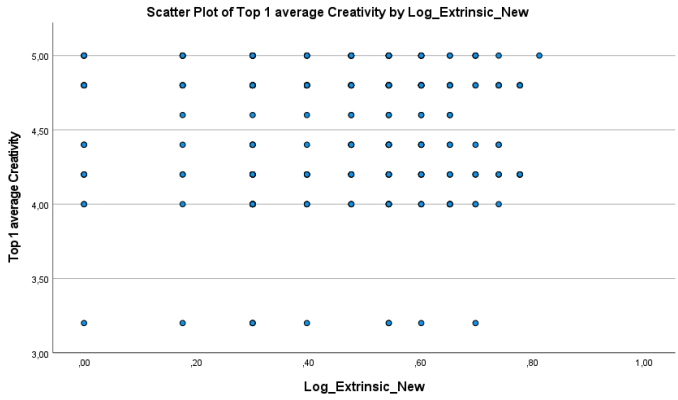
Square root extrinsic and DV top1_creativity:



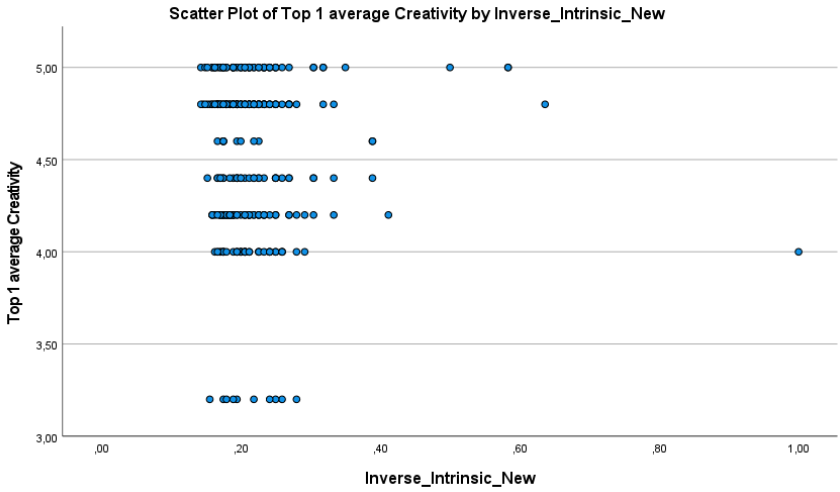
Logarithm intrinsic and DV top1_creativity:



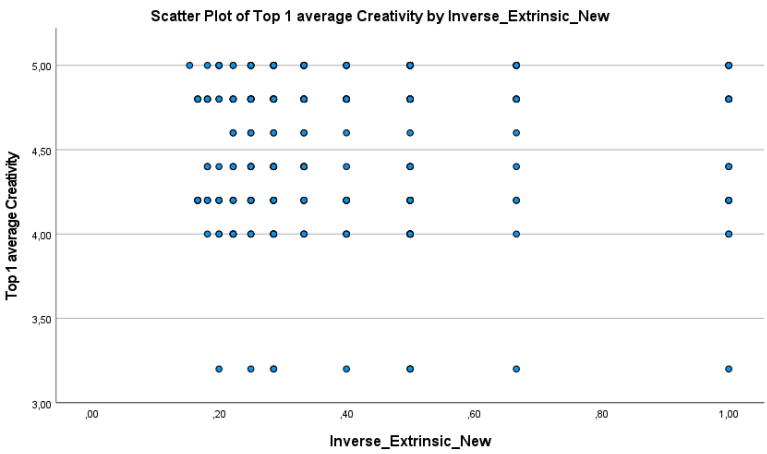
Logarithm extrinsic and DV top1_creativity:



Inverse intrinsic and DV top1_creativity:



Inverse extrinsic and DV top1_creativity:



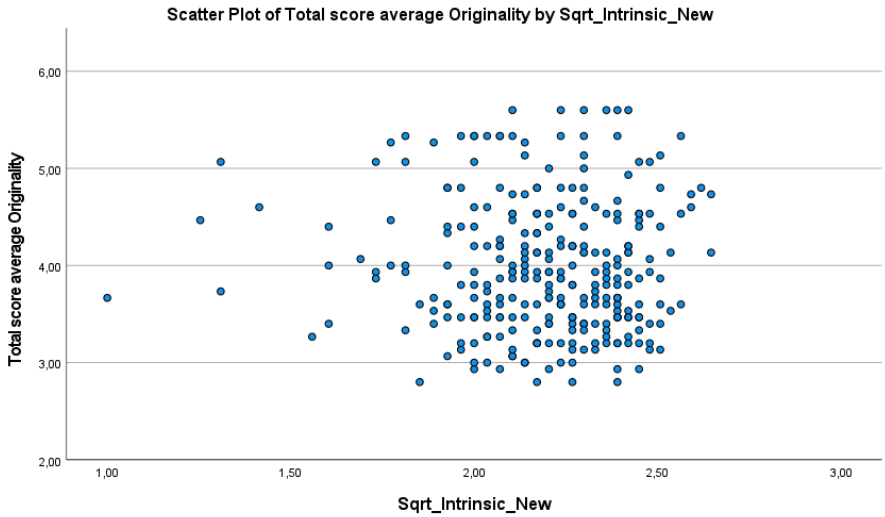
The transformations for the IV's intrinsic and extrinsic motives into square roots, logarithms and inverse did not results in a linear relationship with the DV top1_creativity. Therefore, it can

be concluded that there is no linear relationship between the IV's intrinsic motives and extrinsic motives and between the DV's Totalscore_creativity and top1_creativity.

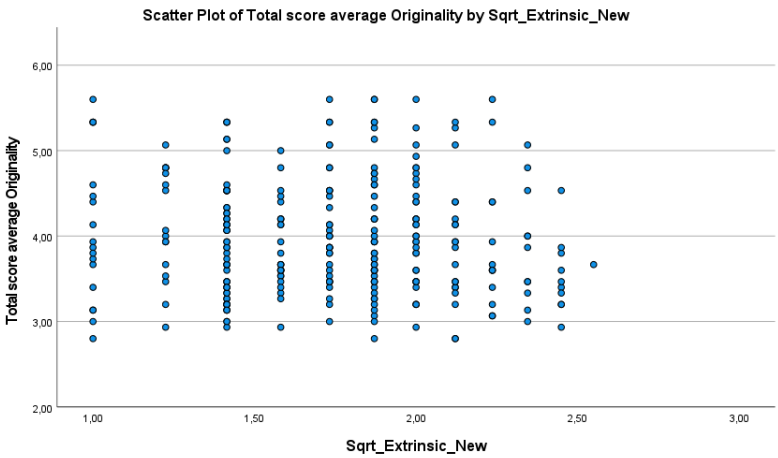
Transformations Total score originality, feasibility, effectiveness

The transformations are also checked for the DV's totalscore_originality, totalscore_feasibility, totalscore_effectiveness.

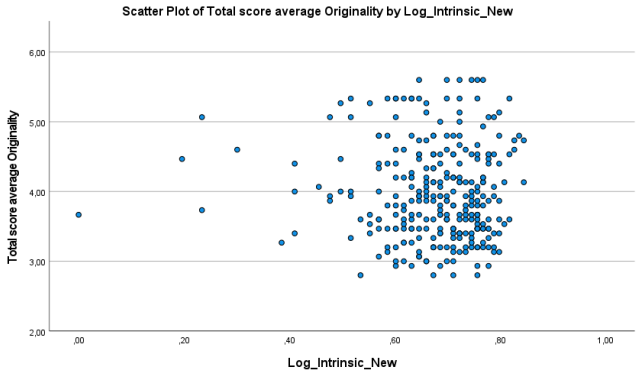
IV square root intrinsic motive and DV totalscore_originality:



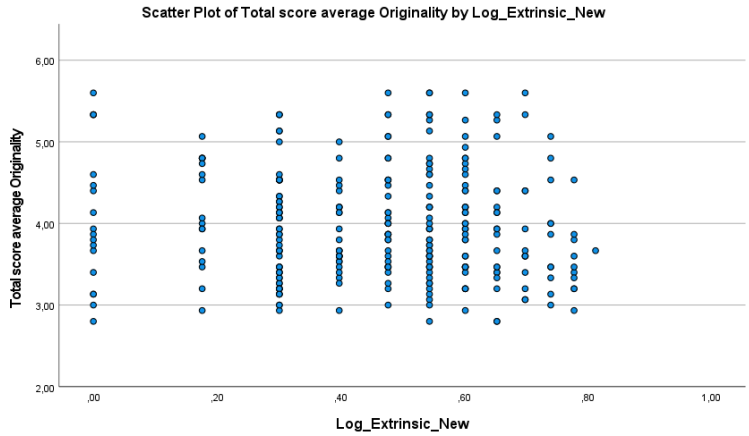
IV square root extrinsic motive and DV totalscore_originality:



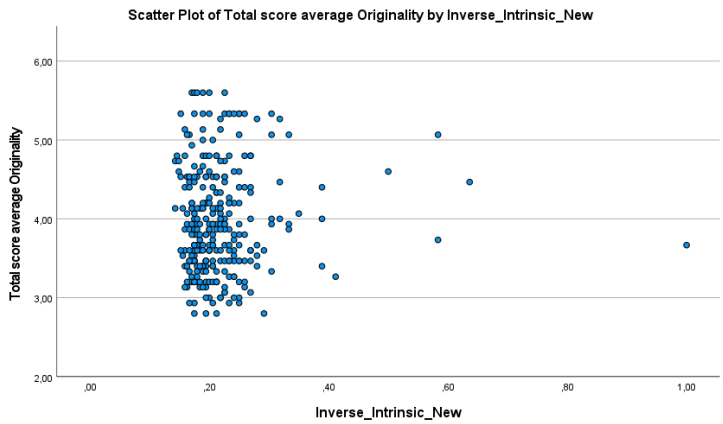
IV logarithm intrinsic motive and DV totalscore_originality:



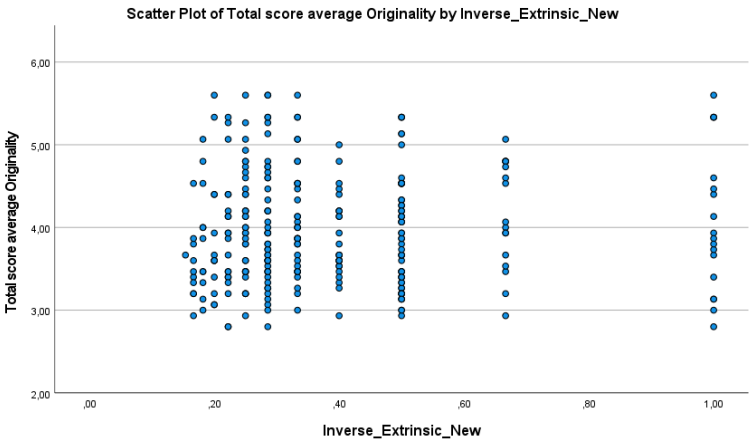
IV logarithm extrinsic motive and DV totalscore_originality:



IV inverse intrinsic motive and DV totalscore_originality:



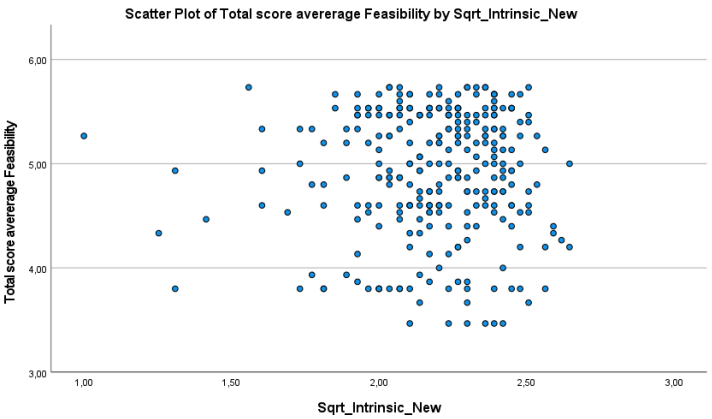
IV inverse extrinsic motive and DV totalscore_originality:



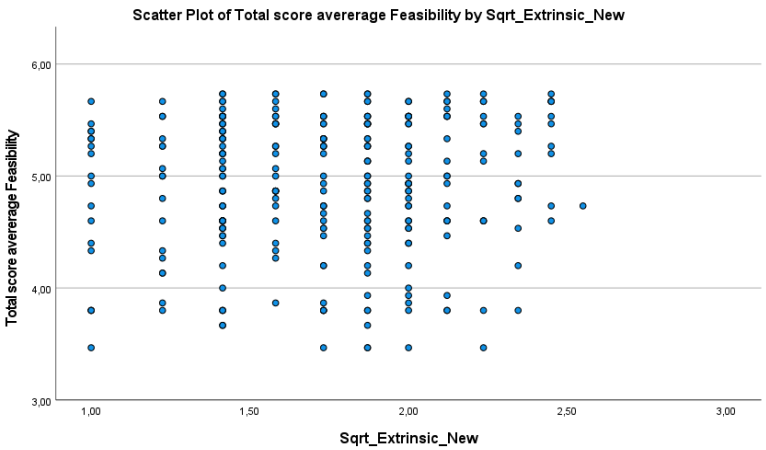
For totalscore_originality the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship.

This is also done for totalscore_feasibility.

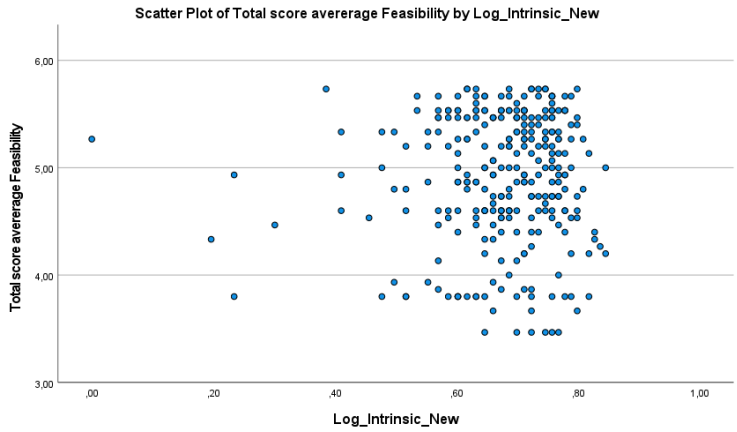
IV square root intrinsic motive and DV totalscore_feasibility:



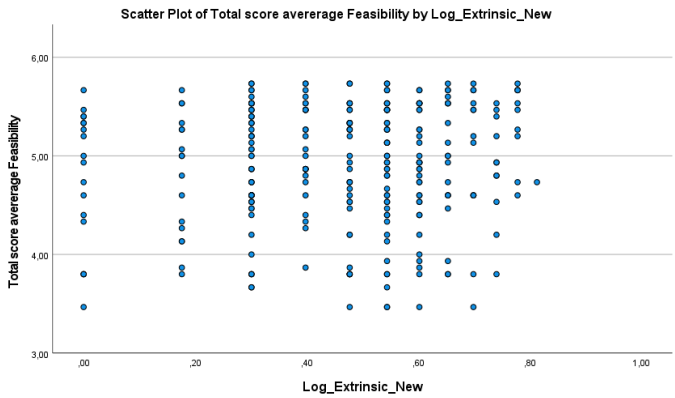
IV square root extrinsic motive and DV totalscore_feasibility:



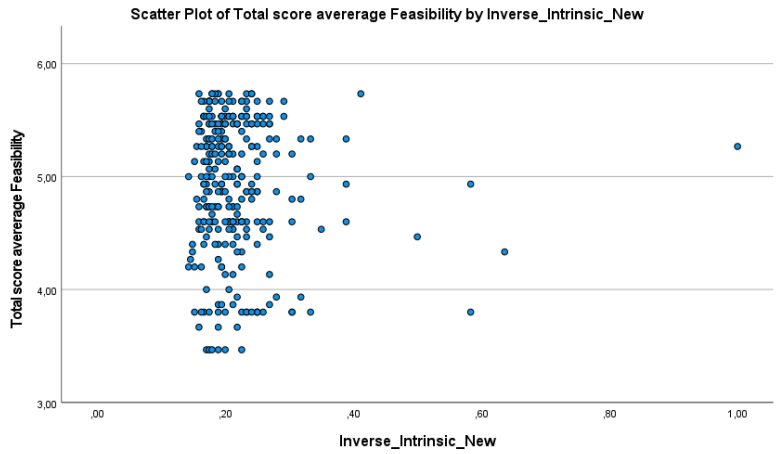
IV logarithm intrinsic motive and DV totalscore_feasibility:



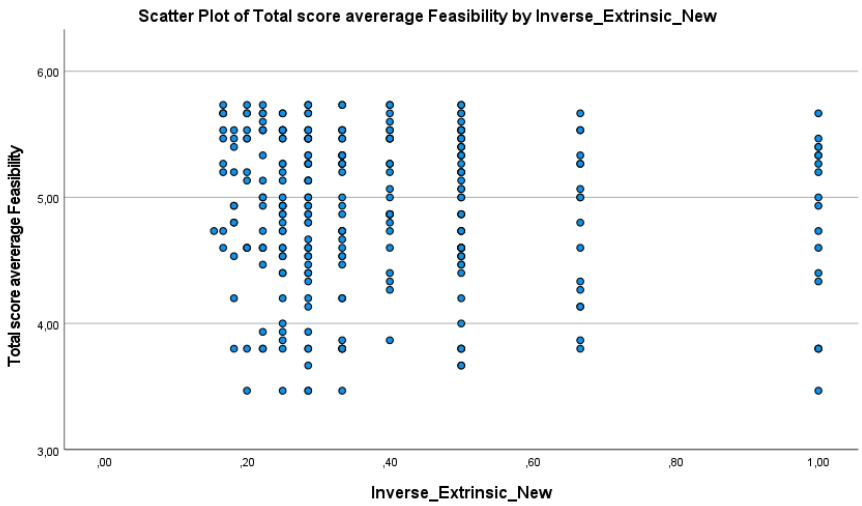
IV logarithm extrinsic motive and DV totalscore_feasibility:



IV inverse intrinsic motive and DV totalscore_feasibility:



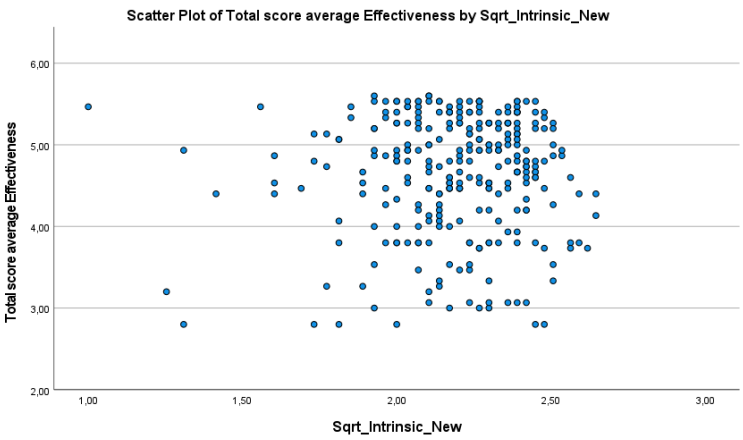
IV inverse extrinsic motive and DV totalscore_feasibility:



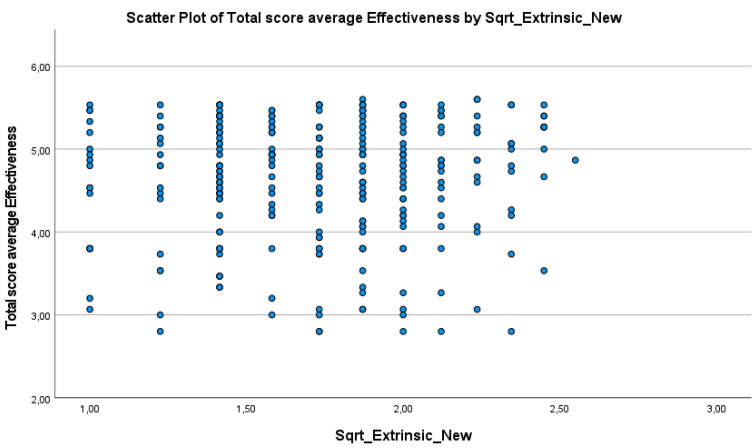
For totalscore_feasibility the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship.

This is also done for totalscore_effectiveness.

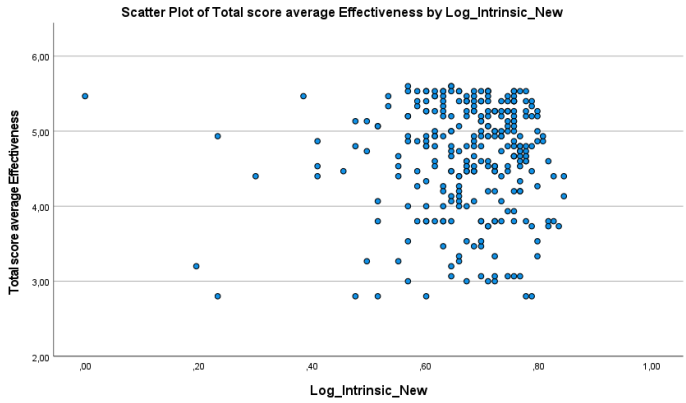
IV square root intrinsic motive and DV totalscore_effectiveness:



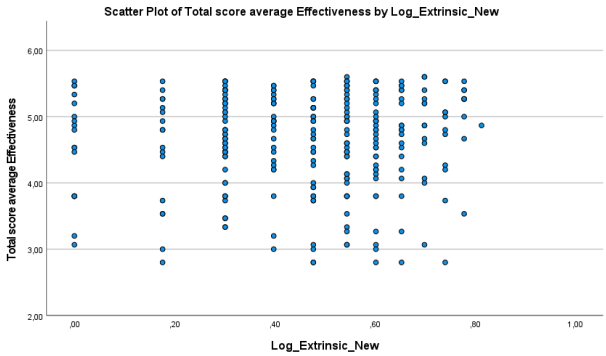
IV square root extrinsic motive and DV totalscore_effectiveness:



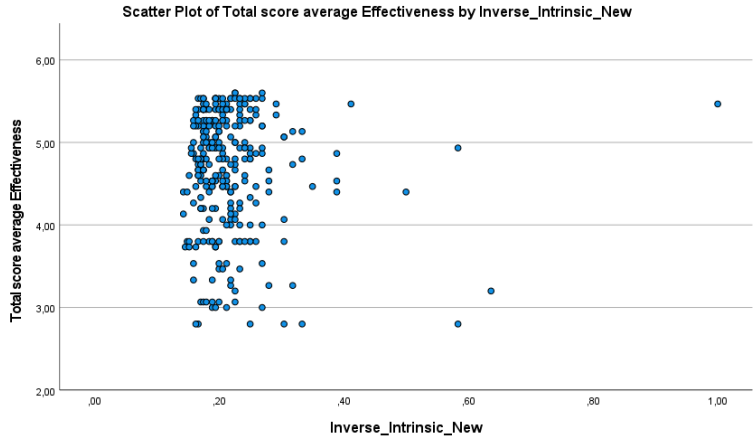
IV logarithm intrinsic motive and DV totalscore_effectiveness:



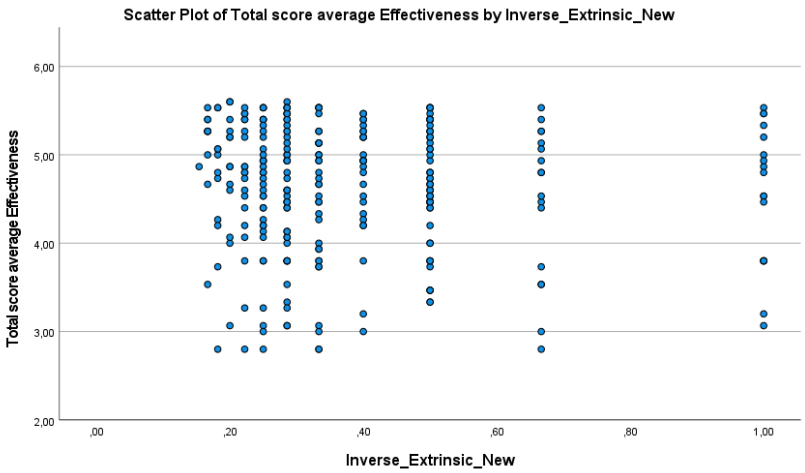
IV logarithm extrinsic motive and DV totalscore_effectiveness:



IV inverse intrinsic motive and DV totalscore_effectiveness:



IV inverse extrinsic motive and DV totalscore_effectiveness:

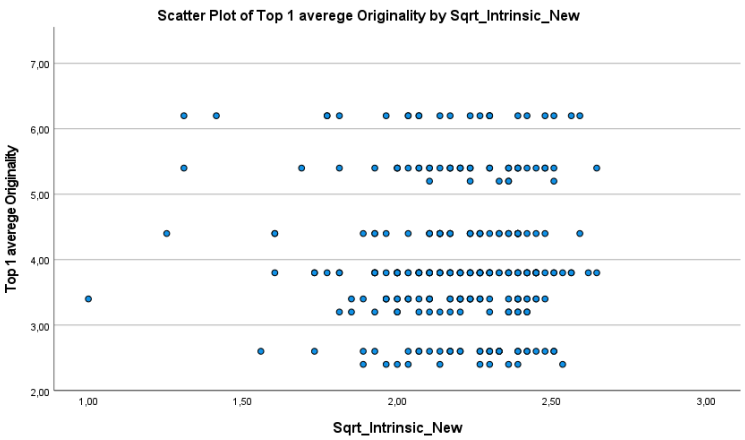


For totalscore_effectiveness the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship.

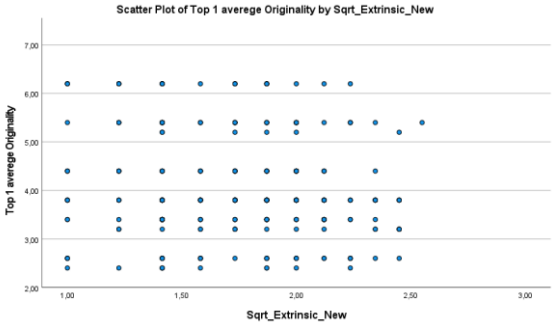
Transformations Top 1 originality, feasibility and effectiveness

The transformations are also checked for the DV's top1_originality, top1_feasibility, top1_effectiveness.

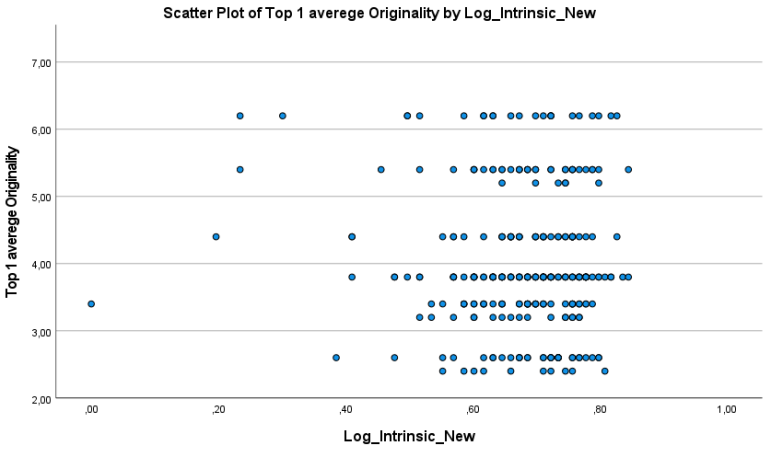
IV square root intrinsic motive and DV top1_originality:



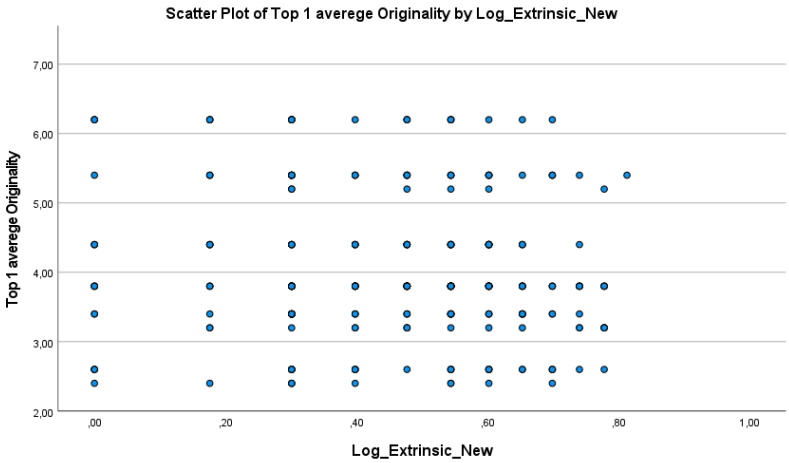
IV square root extrinsic motive and DV top1_originality:



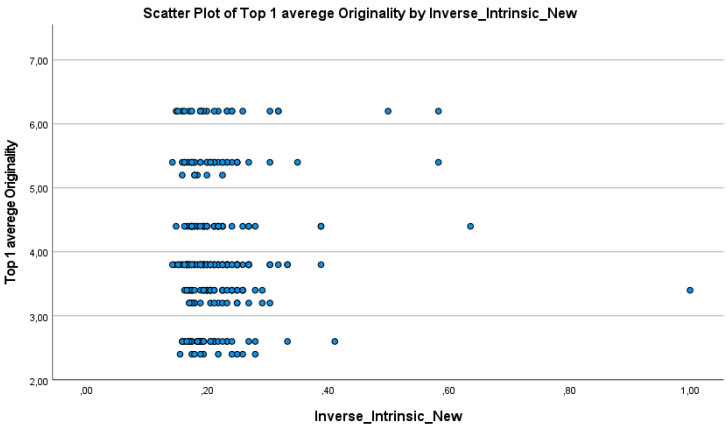
IV logarithm intrinsic motive and DV top1_originality:



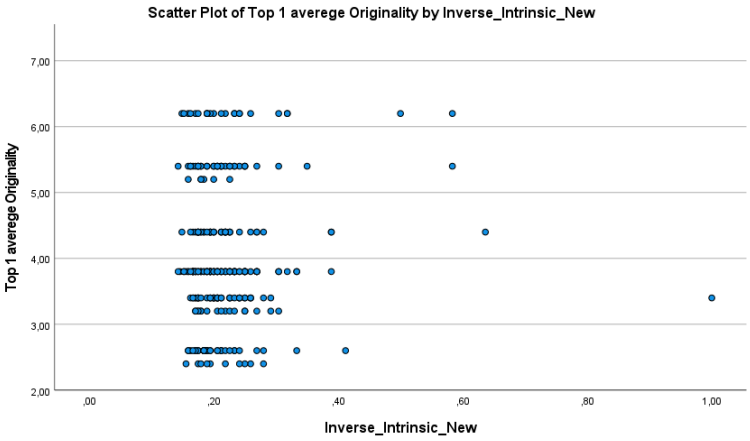
IV logarithm extrinsic motive and DV top1_originality:



IV inverse intrinsic motive and DV top1_originality:

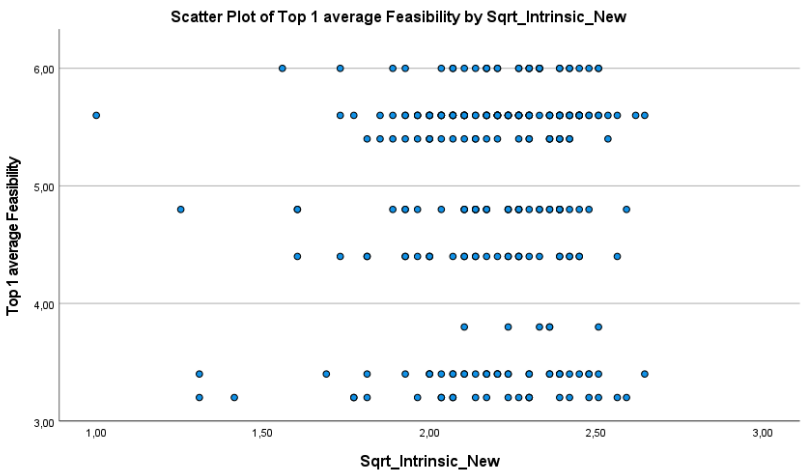


IV inverse extrinsic motive and DV top1_originality:

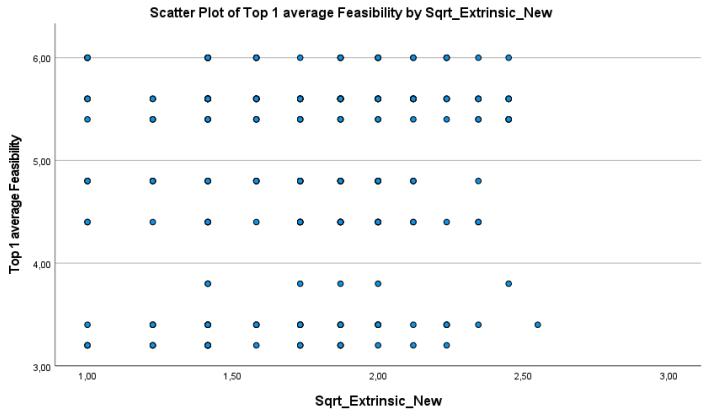


For DV top1_originality the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship. The transformations are also done for top1_feasibility.

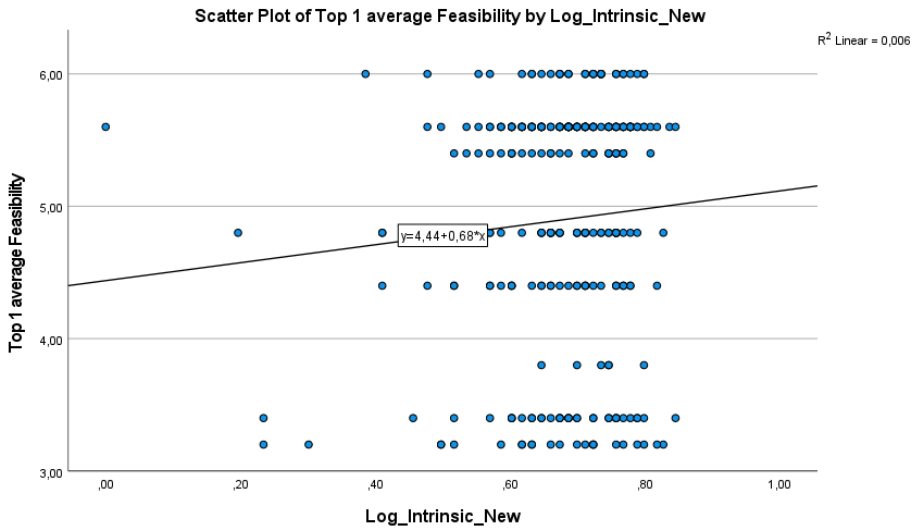
IV square root intrinsic motive and DV top1_feasibility:



IV square root extrinsic motive and DV top1_feasibility:

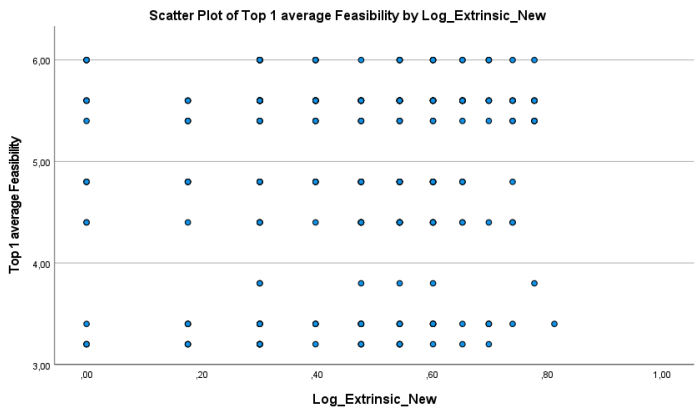


IV logarithm intrinsic motive and DV top1_feasibility:

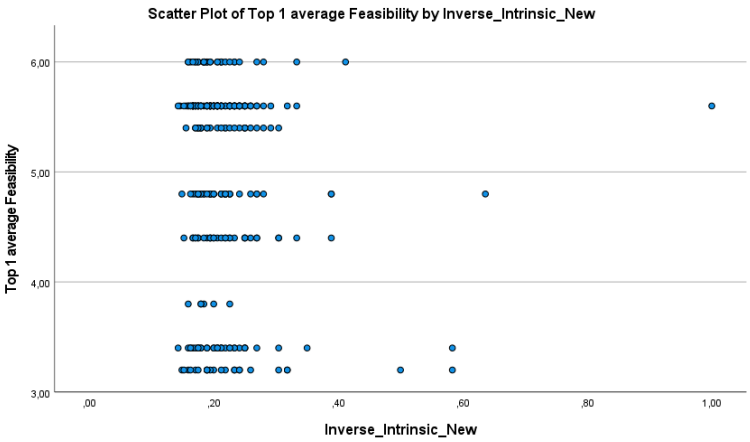


Little more linear but an R2 of 0,006 and therefore still not linear enough.

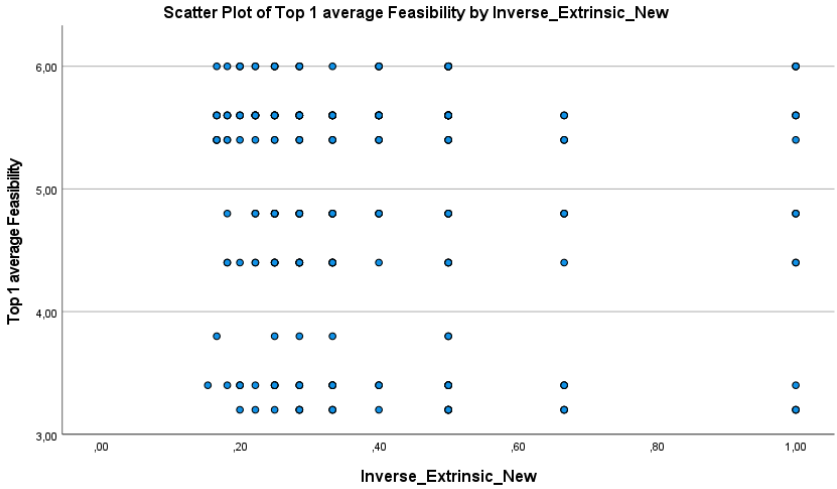
IV logarithm extrinsic motive and DV top1_feasibility:



IV inverse intrinsic motive and DV top1_feasibility:

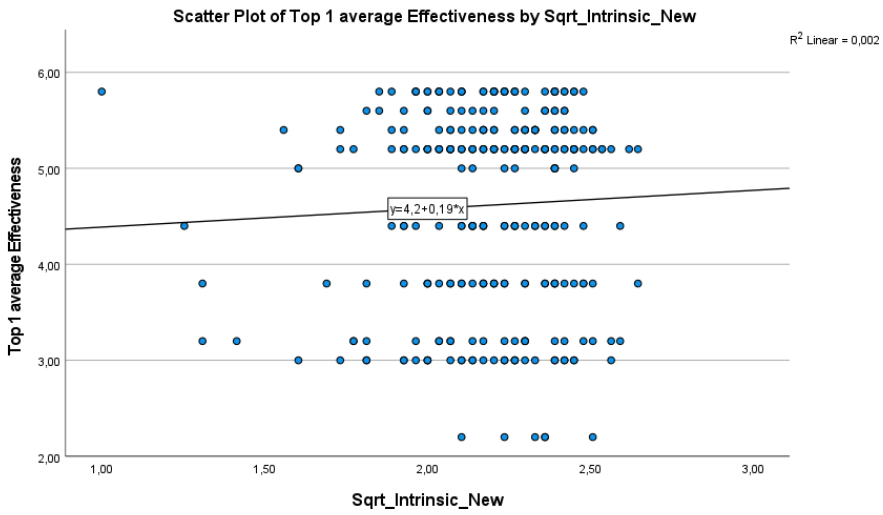


IV inverse extrinsic motive and DV top1_feasibility:



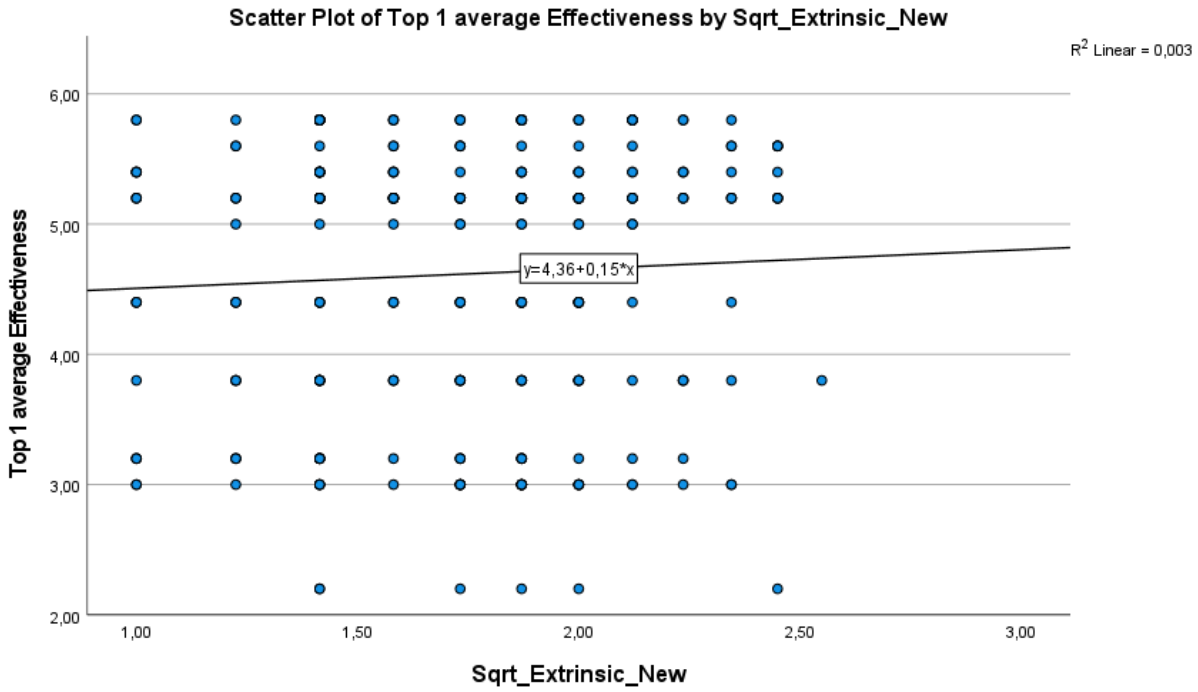
For DV top1_feasibility the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship. The transformations are also done for top1_effectiveness.

IV square root intrinsic motive and DV top1_effectiveness:



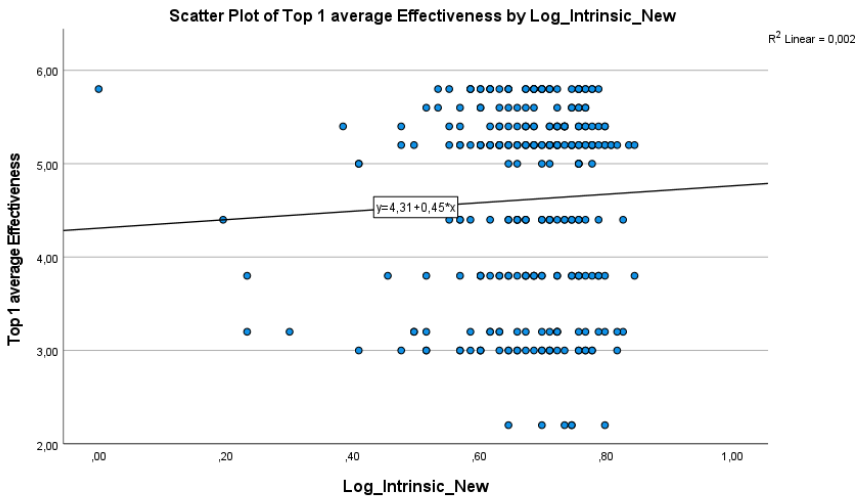
A slightly linear relationship but a R2 of 0,002 is very low and therefore there is no linear relationship between the square root of intrinsic motives and top1_effectiveness.

IV square root extrinsic motive and DV top1_effectiveness:

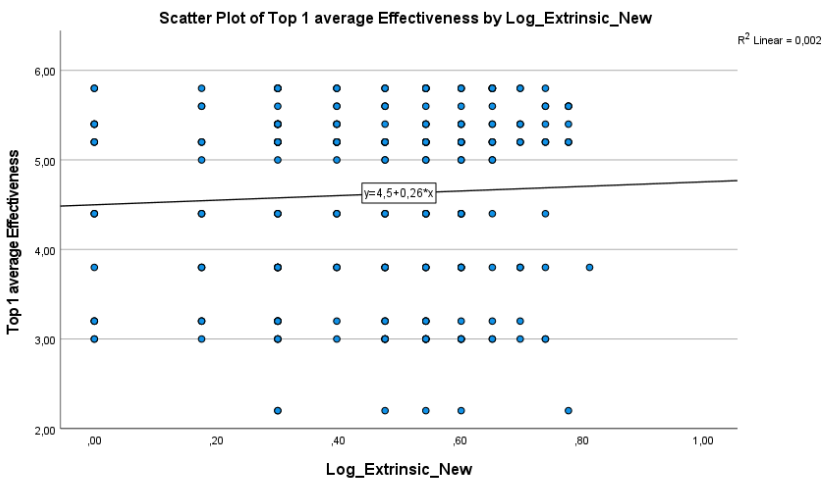


R2= 0,003 so no linear relationship.

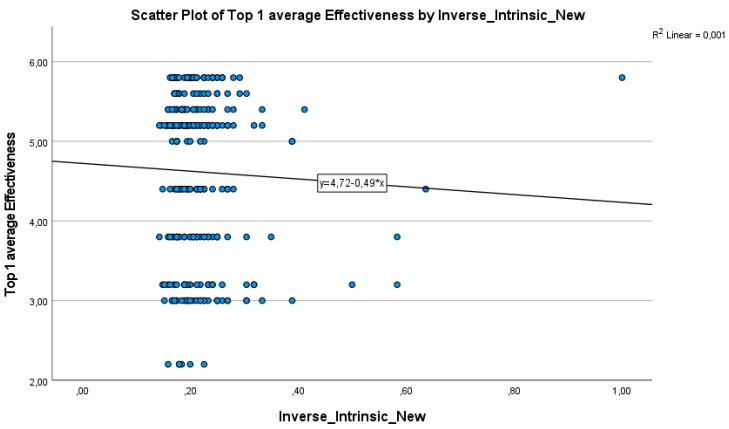
IV logarithm intrinsic motive and DV top1_effectiveness:



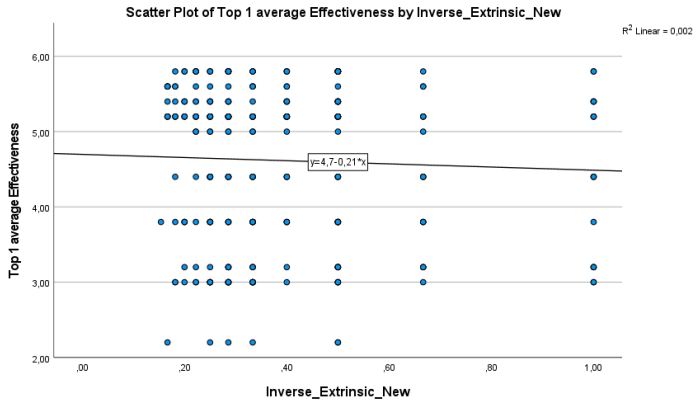
IV logarithm extrinsic motive and DV top1_effectiveness:



IV inverse intrinsic motive and DV top1_effectiveness:



IV inverse extrinsic motive and DV top1_effectiveness:



For DV top1_effectiveness the transformations of the IV's intrinsic and extrinsic motives do also not result in a linear relationship.

Polynomials

Now polynomials are formed to see if this results in linear relationships.

IV intrinsic motives, DV totalscore_creativity:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Creativity

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,000	,000	1	287	,990	4,468	,000		
Quadratic	,001	,214	2	286	,807	4,601	-,062	,007	
Cubic	,010	,965	3	285	,410	4,009	,440	-,121	,010

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,000; 0,001; 0,010) and not significant for all either (0,990; 0,807; 0,410), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV totalscore_creativity.

IV Extrinsic motives, DV totalscore_creativity:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Creativity

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,006	1,651	1	287	,200	4,520	-,016		
Quadratic	,012	1,696	2	286	,185	4,412	,059	-,011	
Cubic	,013	1,276	3	285	,283	4,524	-,067	,030	-,004

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,006; 0,012; 0,013) and not significant for all either (0,200; 0,185; 0,283), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV totalscore_creativity.

IV intrinsic motives, DV totalscore_originality:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Originality

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,001	,293	1	287	,589	4,086	-,022		
Quadratic	,009	1,274	2	286	,281	4,836	-,372	,039	
Cubic	,021	2,045	3	285	,108	3,097	1,104	-,337	,030

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,001; 0,009; 0,021) and not significant for all either (0,589; 0,281; 0,108), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV totalscore_originality.

IV extrinsic motives, DV totalscore_originality:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Originality

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,007	1,936	1	287	,165	4,116	-,043		
Quadratic	,012	1,702	2	286	,184	3,873	,126	-,025	
Cubic	,022	2,092	3	285	,101	4,569	-,657	,228	-,024

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,007; 0,012; 0,022) and not significant for all either (0,165; 0,184; 0,101), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV totalscore_originality.

IV intrinsic motives, DV totalscore_feasibility:

Model Summary and Parameter Estimates

Dependent Variable: Total score avererage Feasibility

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,001	,200	1	287	,655	4,834	,016		
Quadratic	,010	1,397	2	286	,249	4,120	,350	-,037	
Cubic	,019	1,873	3	285	,134	5,491	-,814	,259	-,023

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,001; 0,010; 0,019) and not significant for all either (0,655; 0,249; 0,134), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV totalscore_feasibility.

IV extrinsic motives, DV totalscore_feasibility:

Model Summary and Parameter Estimates

Dependent Variable: Total score avererage Feasibility

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,006	1,596	1	287	,208	4,802	,035		
Quadratic	,007	1,057	2	286	,349	4,931	-,055	,013	
Cubic	,016	1,579	3	285	,195	4,338	,613	-,202	,021

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,006; 0,007; 0,016) and not significant for all either (0,208; 0,349; 0,195), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV totalscore_feasibility.

IV intrinsic motives, DV totalscore_effectiveness:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Effectiveness

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,001	,169	1	287	,681	4,555	,018		
Quadratic	,013	1,904	2	286	,151	3,539	,492	-,052	
Cubic	,022	2,177	3	285	,091	5,155	-,879	,296	-,027

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,001; 0,013; 0,022) and not significant for all either (0,681; 0,151; 0,091), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV totalscore_effectiveness.

IV extrinsic motives, DV totalscore_effectiveness:

Model Summary and Parameter Estimates

Dependent Variable: Total score average Effectiveness

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,005	1,381	1	287	,241	4,519	,039		
Quadratic	,008	1,097	2	286	,335	4,712	-,096	,020	
Cubic	,013	1,272	3	285	,284	4,150	,537	-,184	,020

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,005; 0,008; 0,013) and not significant for all either (0,241; 0,335; 0,284), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV totalscore_effectiveness.

IV intrinsic motives, DV top1_creativity:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Creativity

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,000	,040	1	287	,841	4,483	,005		
Quadratic	,008	1,212	2	286	,299	4,976	-,225	,025	
Cubic	,013	1,266	3	285	,286	4,284	,362	-,124	,012

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,000; 0,008; 0,013) and not significant for all either (0,841; 0,299; 0,286), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV top1_creativity.

IV extrinsic motives, DV top1_creativity:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Creativity

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,000	,054	1	287	,816	4,523	-,005		
Quadratic	,001	,079	2	286	,924	4,482	,024	-,004	
Cubic	,001	,105	3	285	,957	4,376	,144	-,043	,004

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,000; 0,001; 0,001) and not significant for all either (0,816; 0,924; 0,957), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV top1_creativity.

IV intrinsic motives, DV top1_originality:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 averege Originality

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,001	,405	1	287	,525	4,212	-,039		
Quadratic	,015	2,233	2	286	,109	5,745	-,755	,079	
Cubic	,018	1,717	3	285	,164	4,572	,240	-,174	,020

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,001; 0,015; 0,018) and not significant for all either (0,525; 0,109; 0,164), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV top1_originality.

IV extrinsic motives, DV top1_originality:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 averege Originality

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,007	1,932	1	287	,166	4,228	-,066		
Quadratic	,008	1,104	2	286	,333	4,065	,048	-,017	
Cubic	,008	,749	3	285	,524	3,930	,201	-,066	,005

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,007; 0,008; 0,008) and not significant for all either (0,166; 0,333; 0,524), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV top1_originality.

IV intrinsic motives, DV top1_feasibility:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Feasibility

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,004	1,179	1	287	,278	4,605	,060		
Quadratic	,014	1,963	2	286	,142	3,471	,589	-,059	
Cubic	,017	1,657	3	285	,176	4,768	-,511	,221	-,022

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,004; 0,014; 0,017) and not significant for all either (0,278; 0,142; 0,176), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV top1_feasibility.

IV extrinsic motives, DV top1_feasibility:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Feasibility

Equation	Model Summary					Parameter Estimates			
	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,006	1,785	1	287	,183	4,718	,057		
Quadratic	,007	1,008	2	286	,366	4,852	-,037	,014	
Cubic	,007	,670	3	285	,571	4,843	-,027	,010	,000

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,006; 0,007; 0,007) and not significant for all either (0,183; 0,366; 0,571), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV top1_feasibility.

IV intrinsic motives, DV top1_effectiveness:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Effectiveness

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,002	,473	1	287	,492	4,413	,042		
Quadratic	,006	,922	2	286	,399	3,529	,455	-,046	
Cubic	,012	1,112	3	285	,344	5,235	-,993	,322	-,029

The independent variable is All items in the intrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,002; 0,006; 0,012) and not significant for all either (0,492; 0,399; 0,344), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV intrinsic motives with the DV top1_effectiveness.

IV extrinsic motives, DV top1_effectiveness:

Model Summary and Parameter Estimates

Dependent Variable: Top 1 average Effectiveness

	Model Summary					Parameter Estimates			
Equation	R Square	F	df1	df2	Sig.	Constant	b1	b2	b3
Linear	,003	,994	1	287	,320	4,470	,047		
Quadratic	,006	,827	2	286	,438	4,716	-,126	,025	
Cubic	,007	,633	3	285	,595	4,405	,225	-,088	,011

The independent variable is All items in the extrinsic variable.

The R2 of the Linear, Quadratic and Cubic output is very low (0,003; 0,006; 0,007) and not significant for all either (0,320; 0,438; 0,595), since the value should be below 0,05 to be significant. This also concludes that there is no linearity for the IV extrinsic motives with the DV top1_effectiveness.

Conclusion linearity

There is no linear relation found between the IV's (intrinsic motives and extrinsic motives) and the DV's (Totalscore_creativity, Totalscore_originality, Totalscore_feasibility, Totalscore_effectiveness, Top1_creativity, Top1_originality, Top1_feasibility, Top1_effectiveness), also not after transforming the IV's with square root, logarithm and inverse and using polynomials. This entails that there is a non-linear relationship between the IV's and the DV's. Therefore, it can be concluded that the assumption of linearity is not met within this study.

The other assumptions will now be tested for all the individual DV's

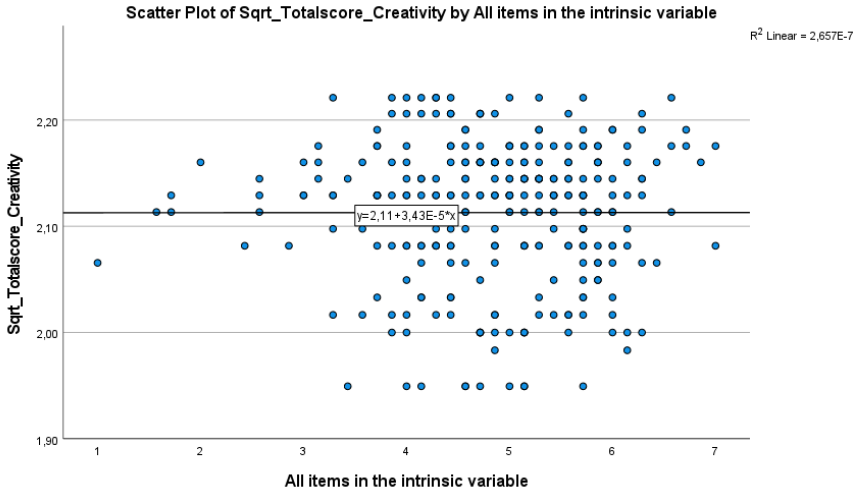
Transformations of the DV's

Now the DV's will be transformed to see if this results in better output for linearity.

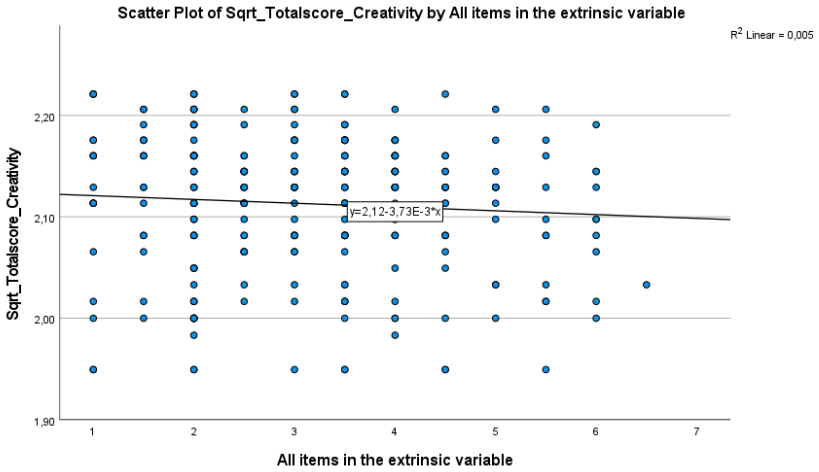
Transformations total score (top 3)

The first transformation will be for totalscore_creatity.

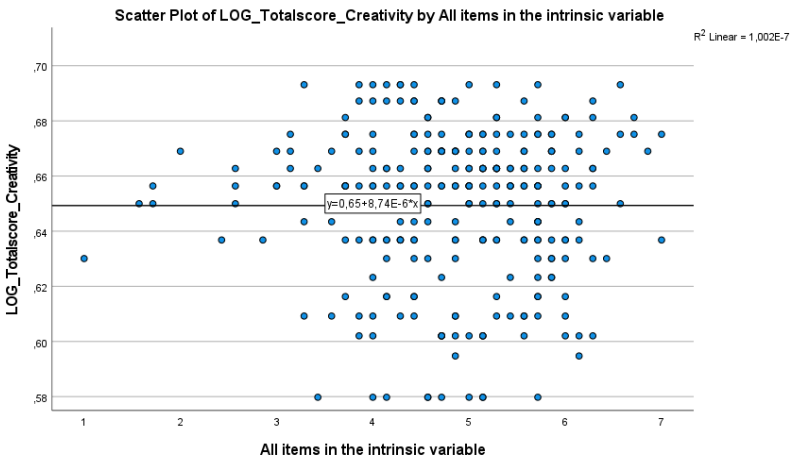
Transformation total score creativity



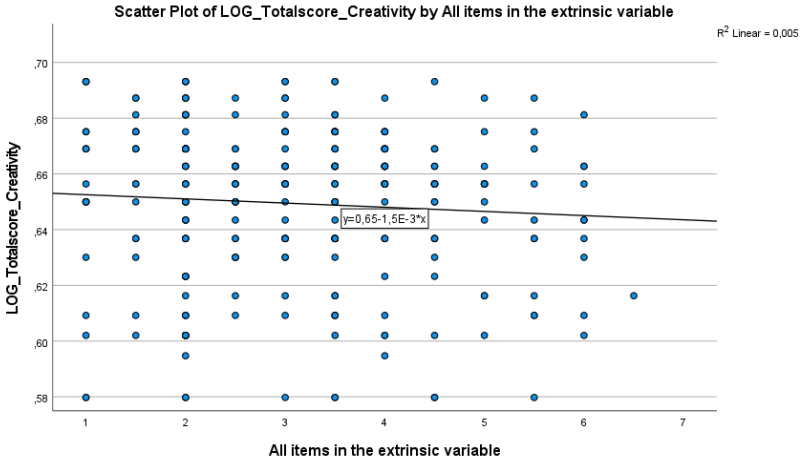
Square root of the DV totalscore_creativity with the IV intrinsic motives. No linearity.



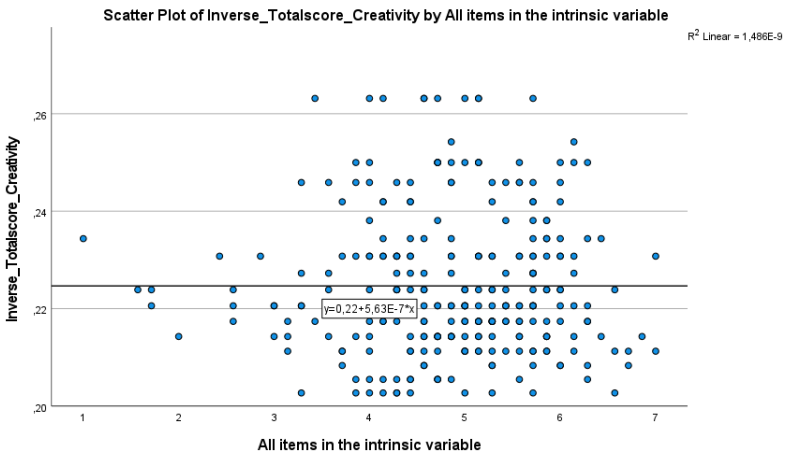
Square root of the DV totalscore_creativity with the IV extrinsic motives. No linearity.



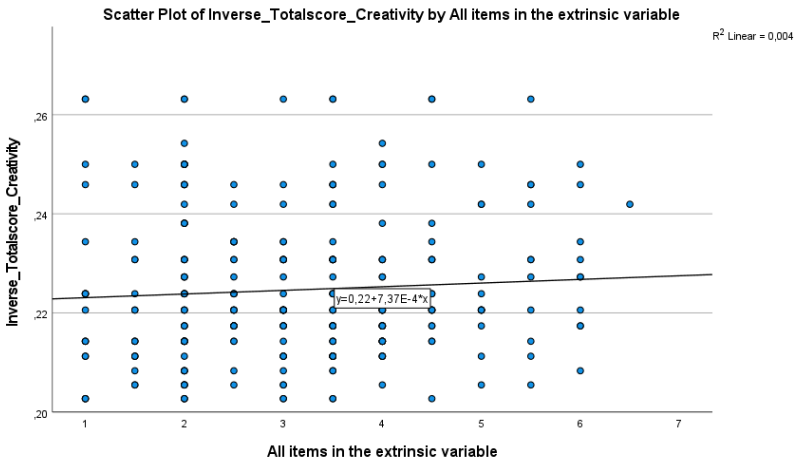
Logarithm of the DV totalscore_creativity with the IV intrinsic motives. No linearity.



Logarithm of the DV totalscore_creativity with the IV extrinsic motives. No linearity.

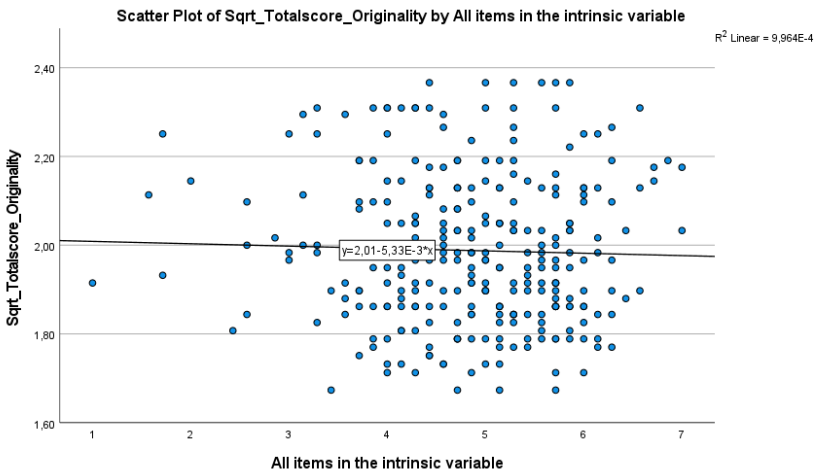


Logarithm of the DV totalscore_creativity with the IV intrinsic motives. No linearity.

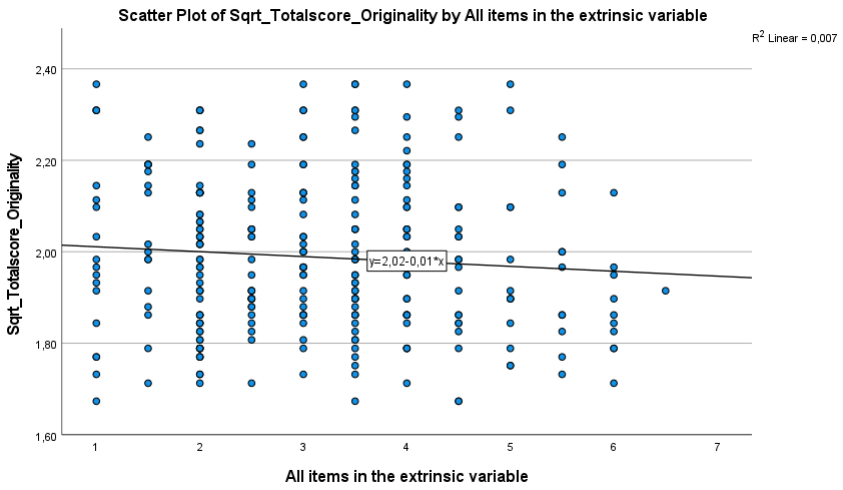


Logarithm of the DV totalscore_creativity with the IV extrinsic motives. R2 = 0,004. No linearity.

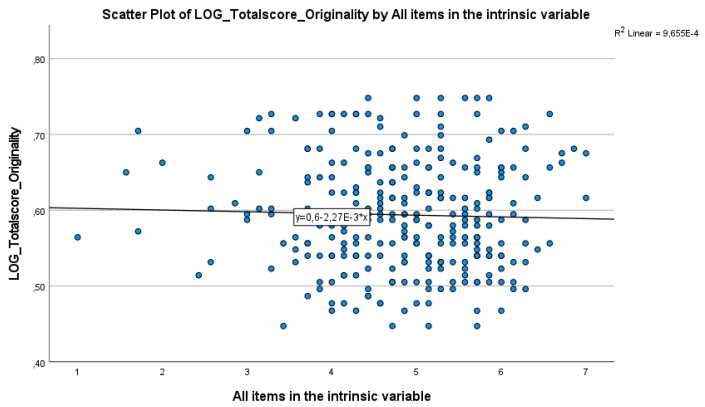
Transformation for DV totalscore_originality:



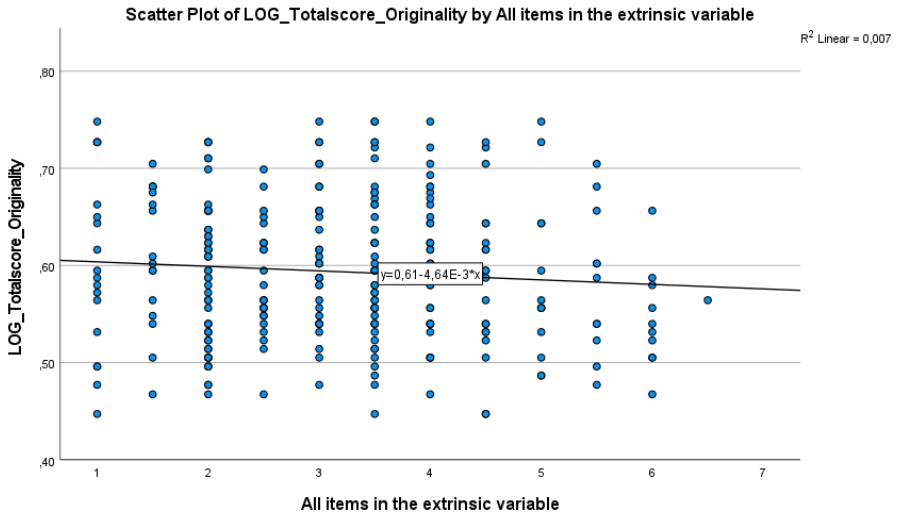
Square root of the DV totalscore_originality with the IV intrinsic motives. No linearity.



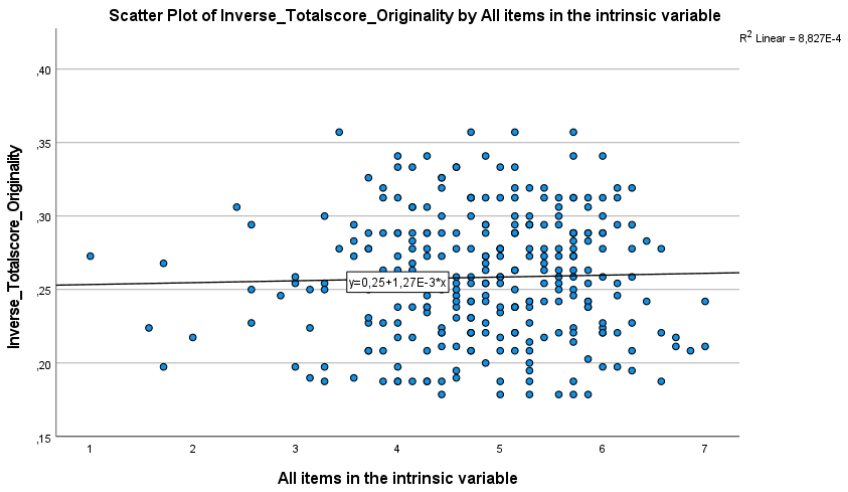
Square root of the DV totalscore_originality with the IV extrinsic motives. No linearity.



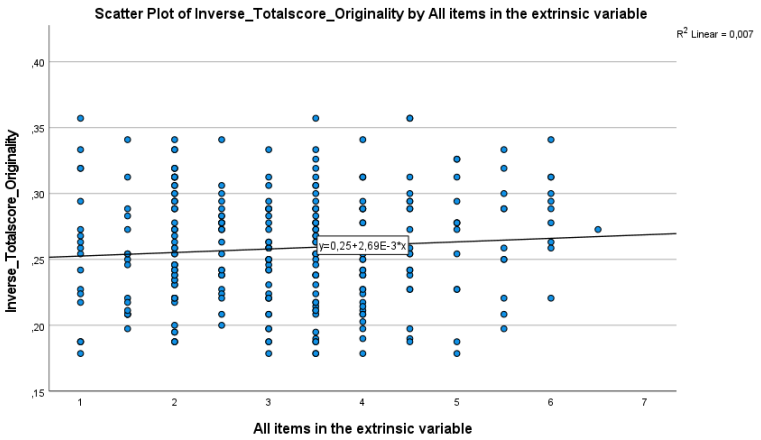
Logarithm of the DV totalscore_originality with the IV intrinsic motives. No linearity.



Logarithm of the DV totalscore_originality with the IV extrinsic motives. No linearity.

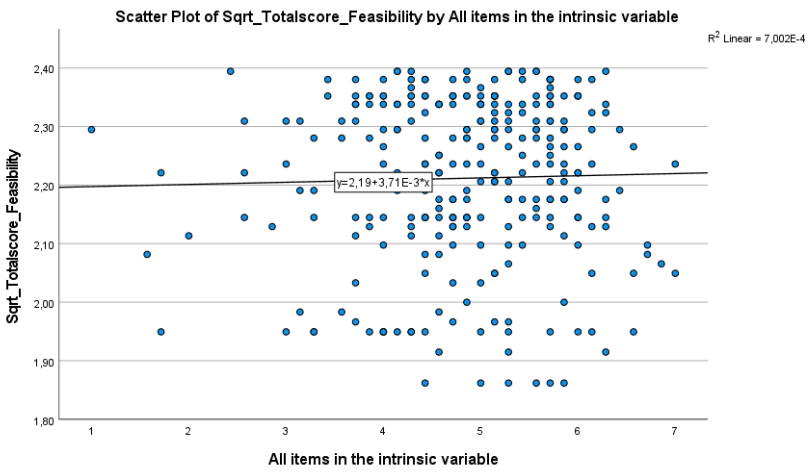


Inverse of the DV totalscore_originality with the IV intrinsic motives. No linearity.

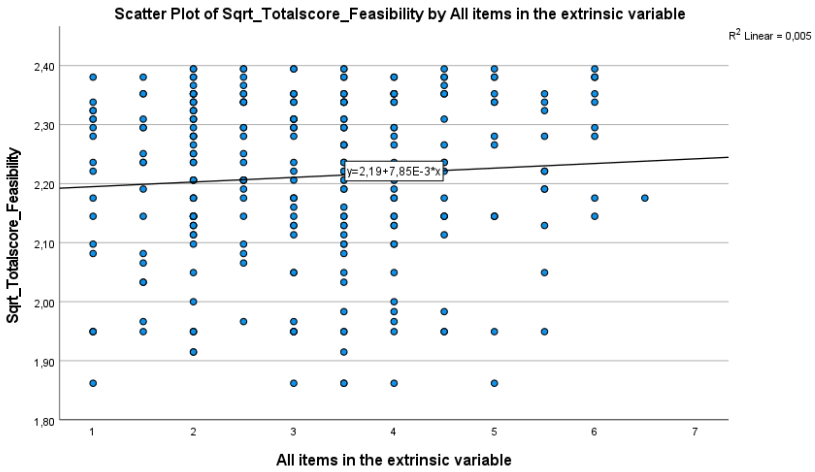


Inverse of the DV totalscore_originality with the IV extrinsic motives. No linearity.

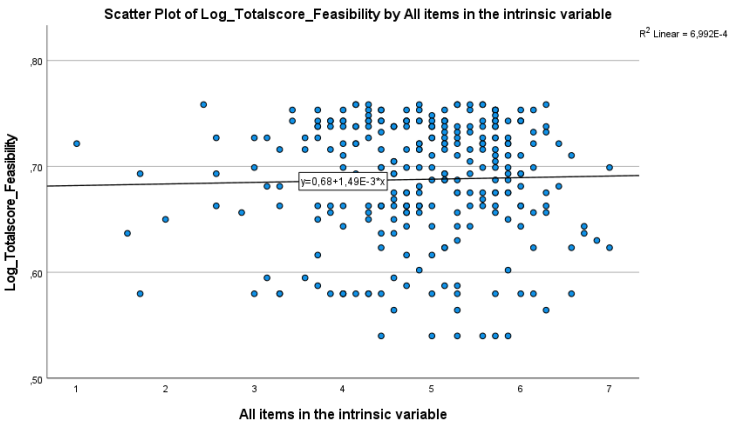
Transformation for DV totalscore_feasibility:



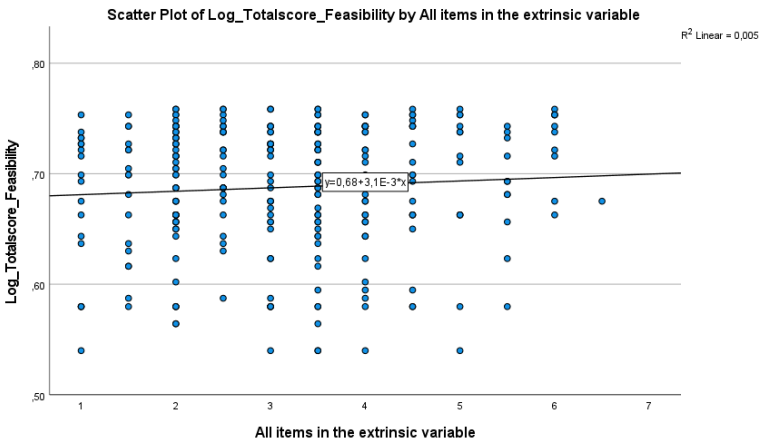
Square root of the DV totalscore_feasibility with the IV intrinsic motives. No linearity.



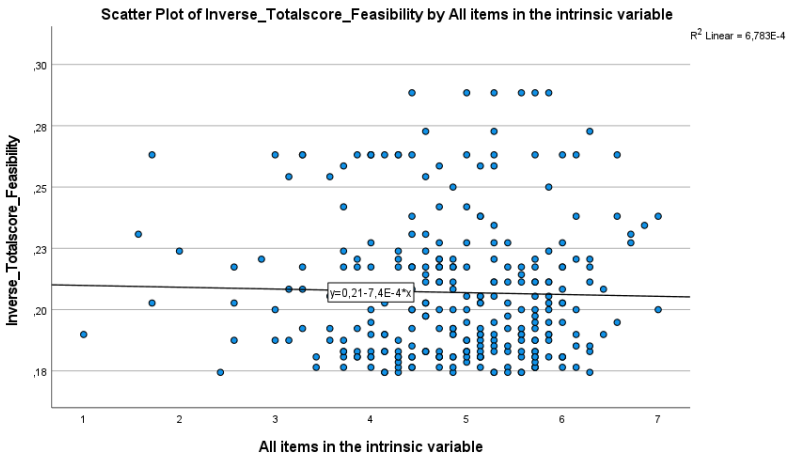
Square root of the DV totalscore_feasibility with the IV extrinsic motives. No linearity.



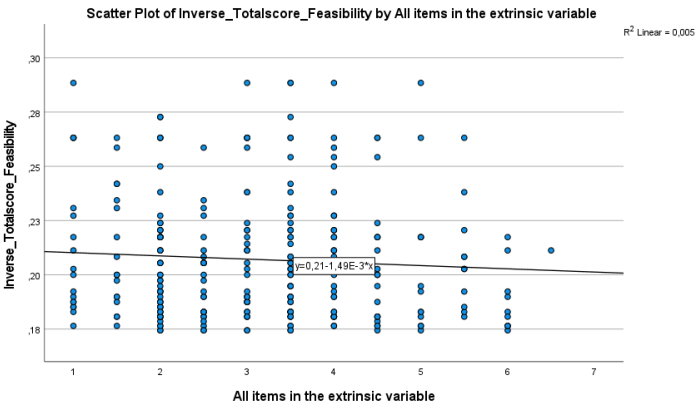
Logarithm of the DV totalscore_feasibility with the IV intrinsic motives. No linearity.



Logarithm of the DV totalscore_feasibility with the IV extrinsic motives. No linearity.

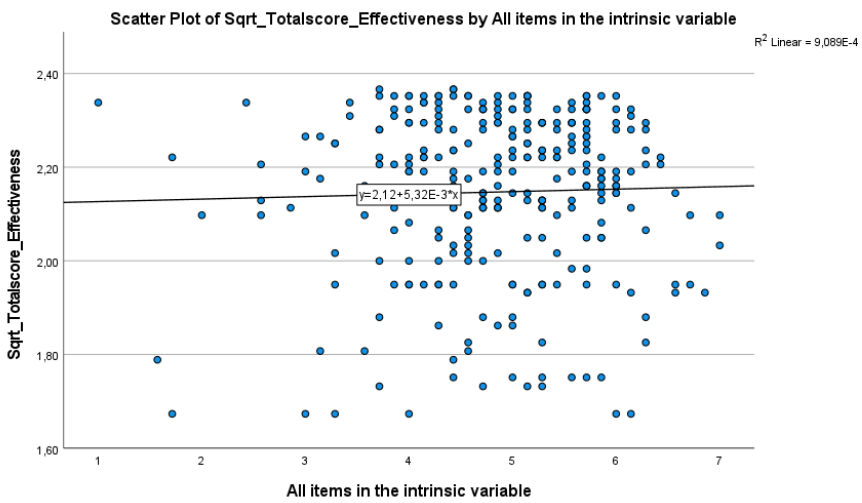


Inverse of the DV totalscore_feasibility with the IV intrinsic motives. No linearity.

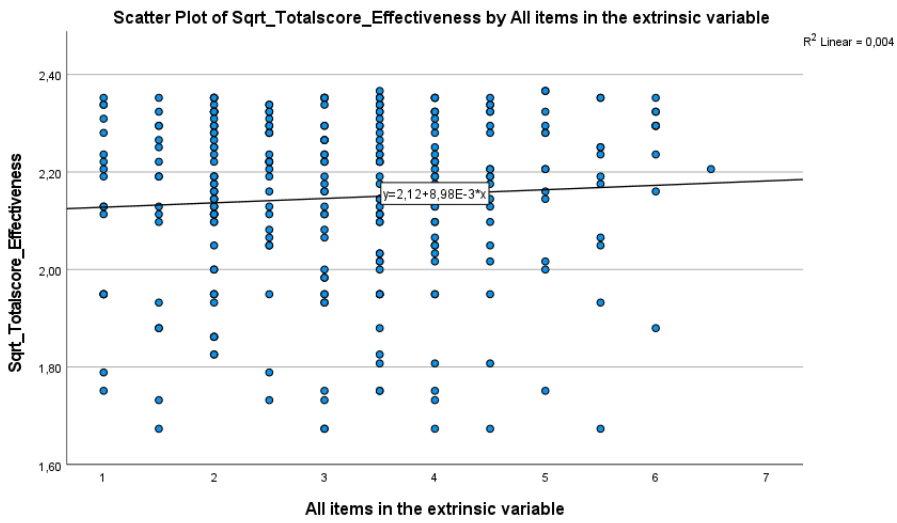


Inverse of the DV totalscore_feasibility with the IV extrinsic motives. No linearity.

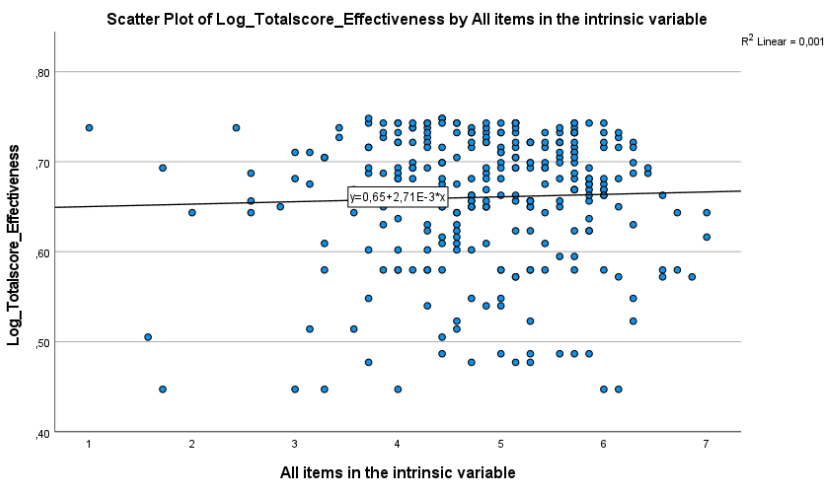
Transformations DV totalscore_effectiveness:



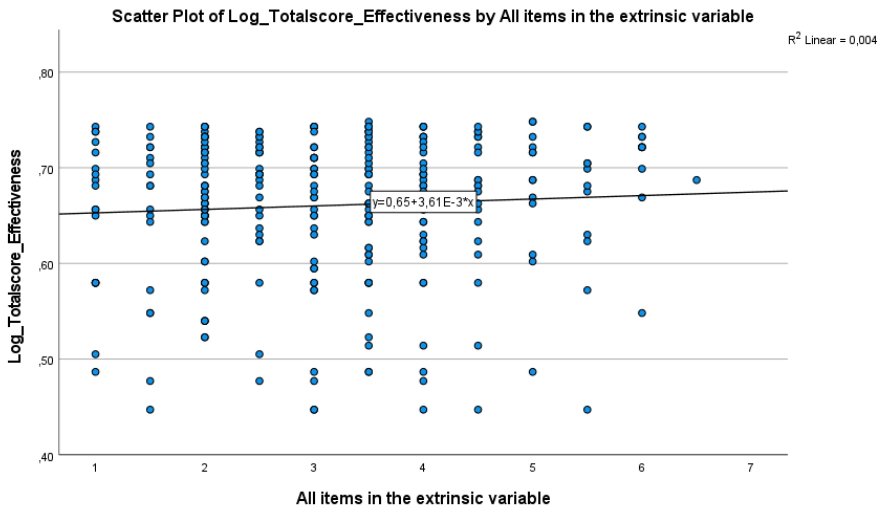
Square root of the DV totalscore_effectiveness with the IV intrinsic motives. No linearity.



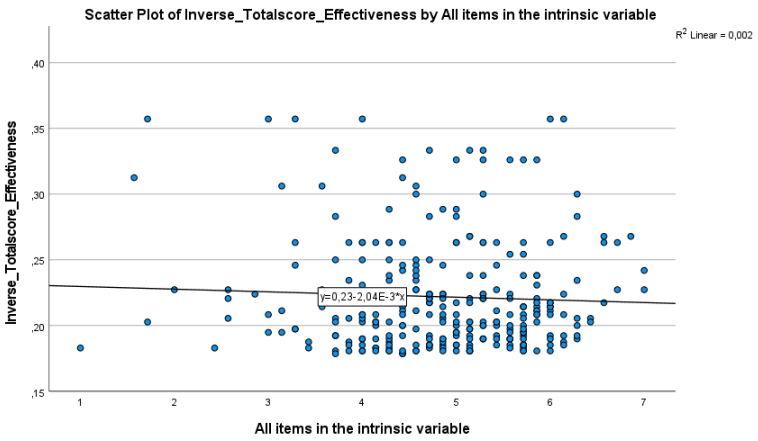
Square root of the DV totalscore_effectiveness with the IV extrinsic motives. No linearity.



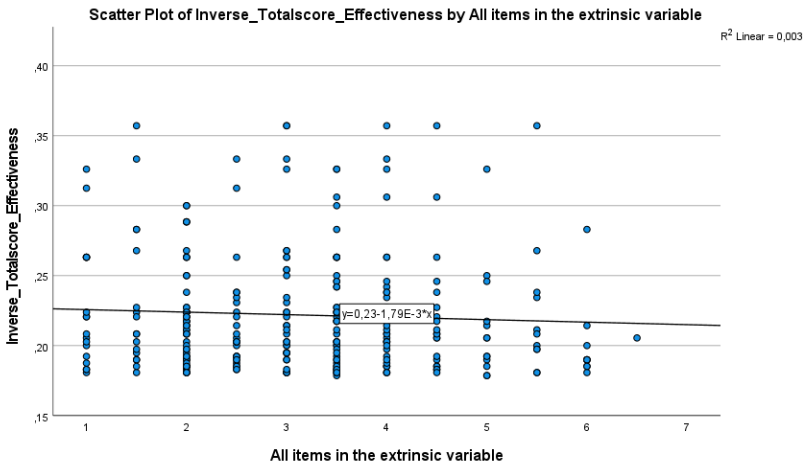
Logarithm of the DV totalscore_effectiveness with the IV intrinsic motives. No linearity.



Logarithm of the DV totalscore_effectiveness with the IV extrinsic motives. No linearity.



Inverse of the DV totalscore_effectiveness with the IV intrinsic motives. No linearity.

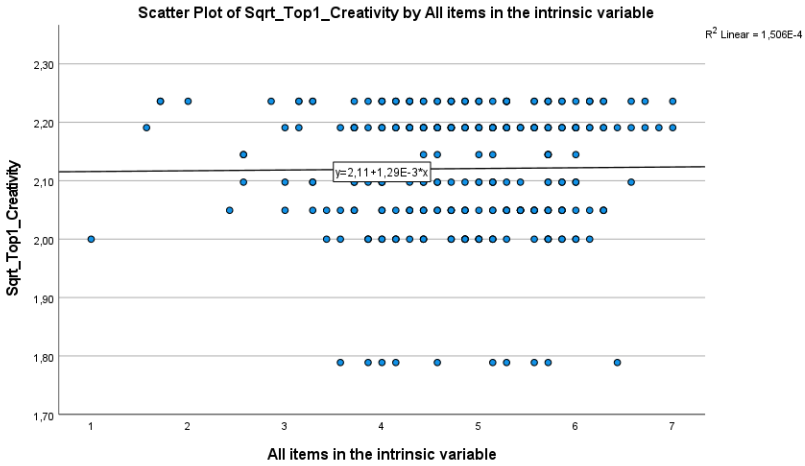


Inverse of the DV totalscore_effectiveness with the IV extrinsic motives. No linearity.

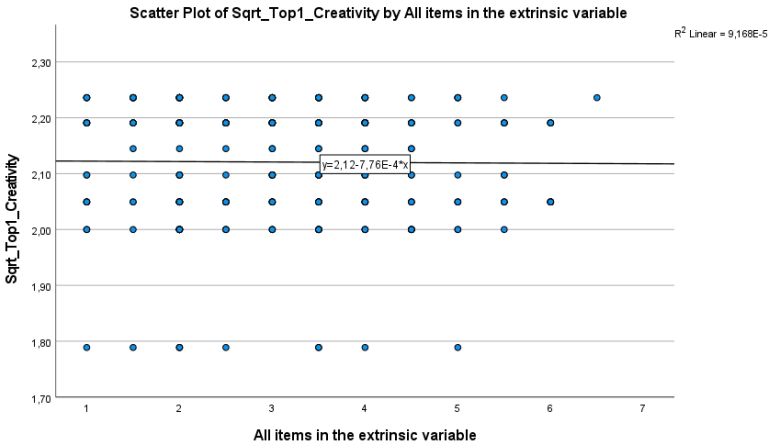
Now this will also be done for the top 1 score for creativity, originality, feasibility and effectiveness, to see if there are differences for making a top 3 or making a top 1.

Transformations top 1

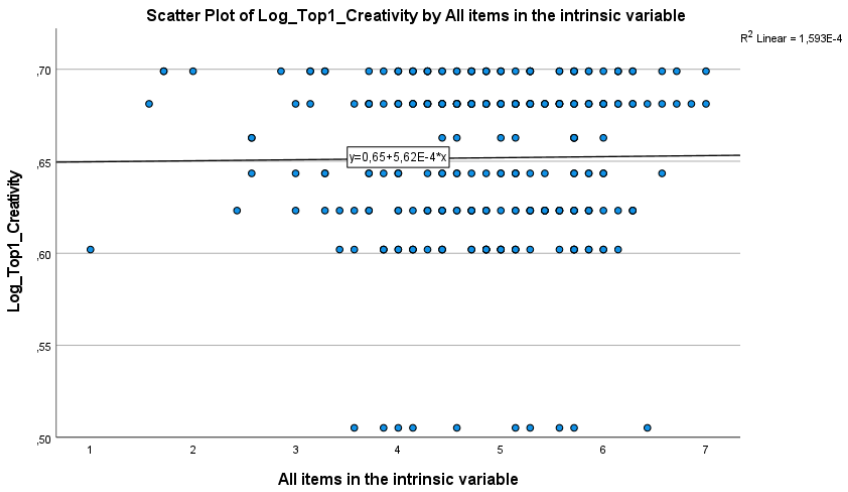
Transformation for Top1_creativity:



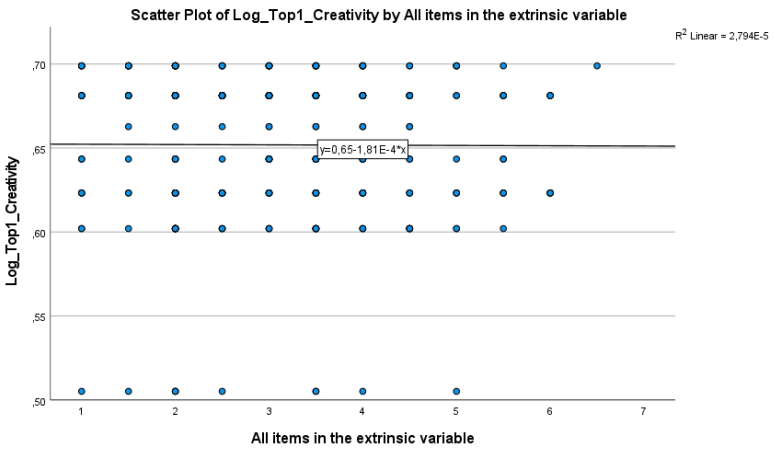
Square root of the DV Top1_creativity with the IV intrinsic motives. No linearity.



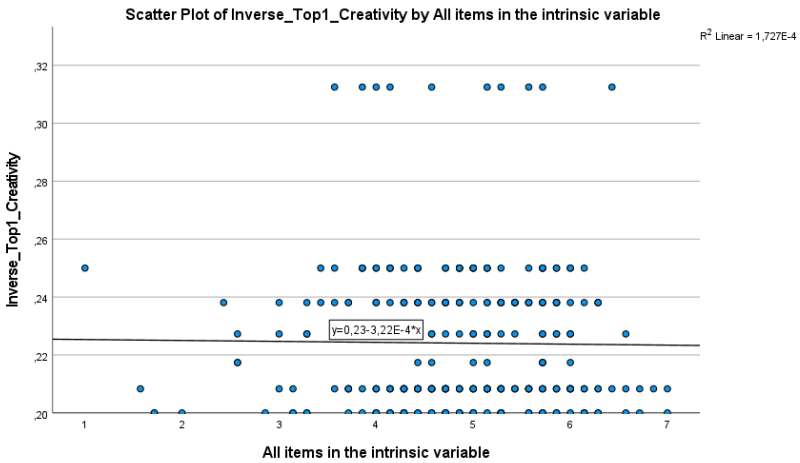
Square root of the DV Top1_creativity with the IV extrinsic motives. No linearity.



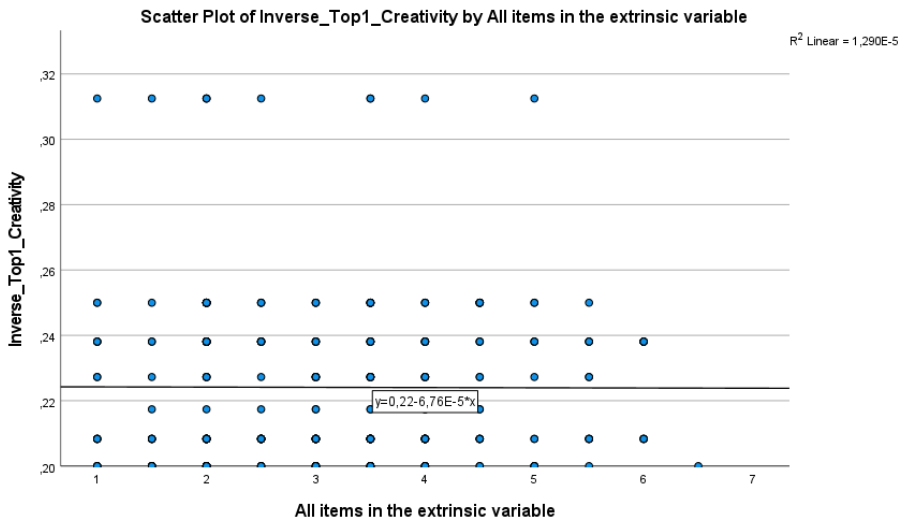
Logarithm of the DV Top1_creativity with the IV intrinsic motives. No linearity.



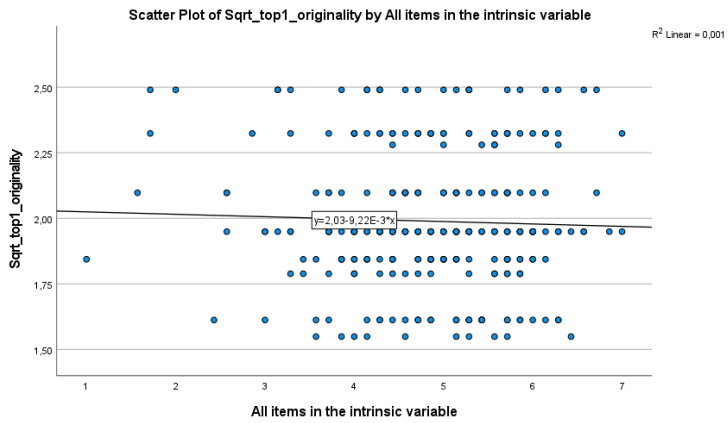
Logarithm of the DV Top1_creativity with the IV extrinsic motives. No linearity.



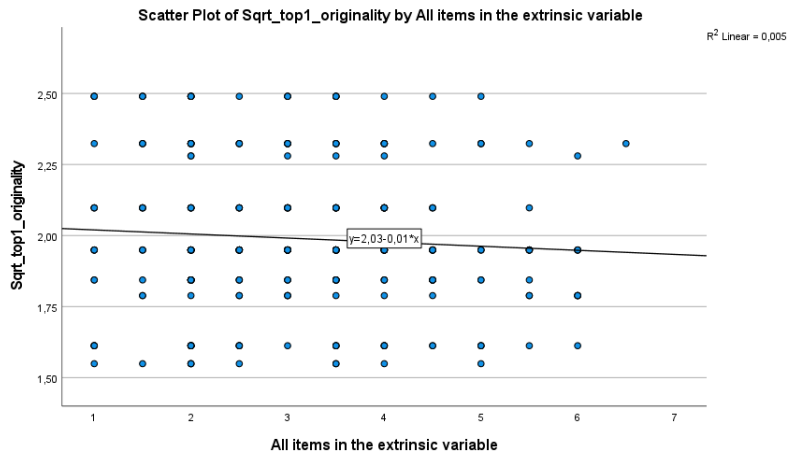
Inverse of the DV Top1_creativity with the IV intrinsic motives. No linearity.



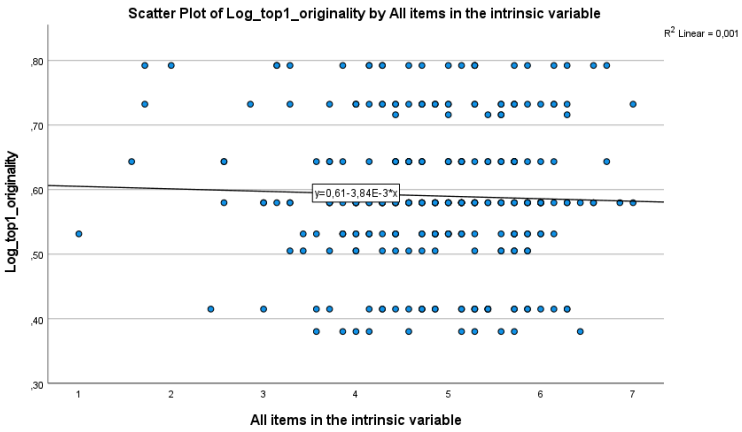
Inverse of the DV Top1_creativity with the IV extrinsic motives. No linearity.



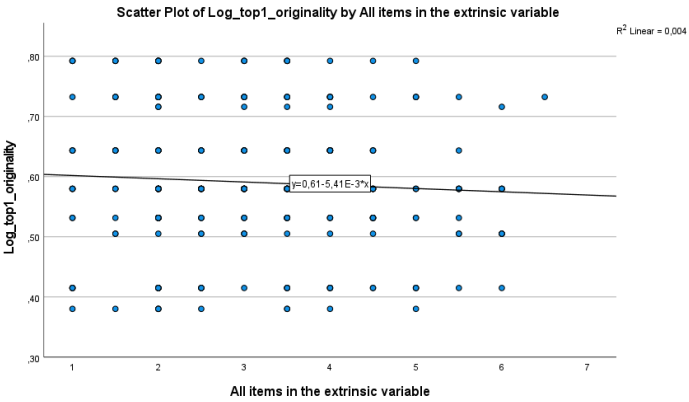
Square of the DV Top1_originality with the IV intrinsic motives. No linearity.



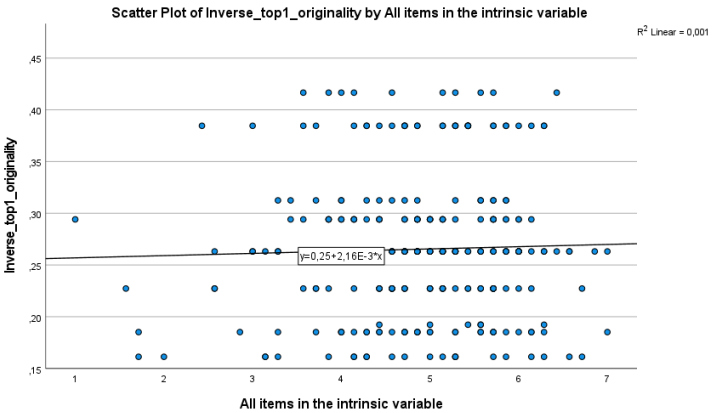
Square of the DV Top1_originality with the IV extrinsic motives. No linearity.



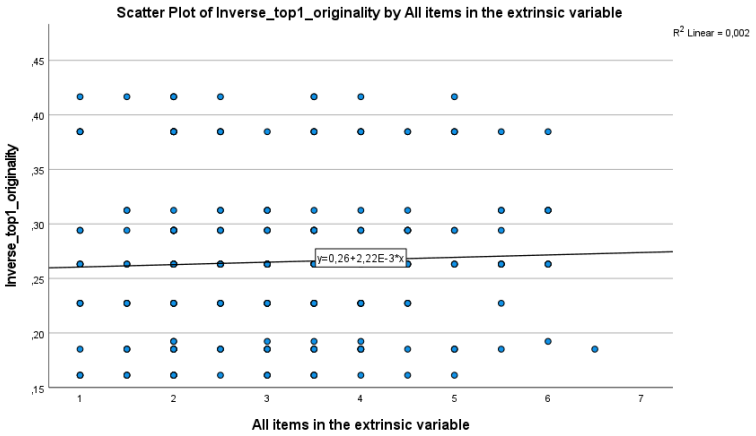
Logarithm of the DV Top1_originality with the IV intrinsic motives. No linearity.



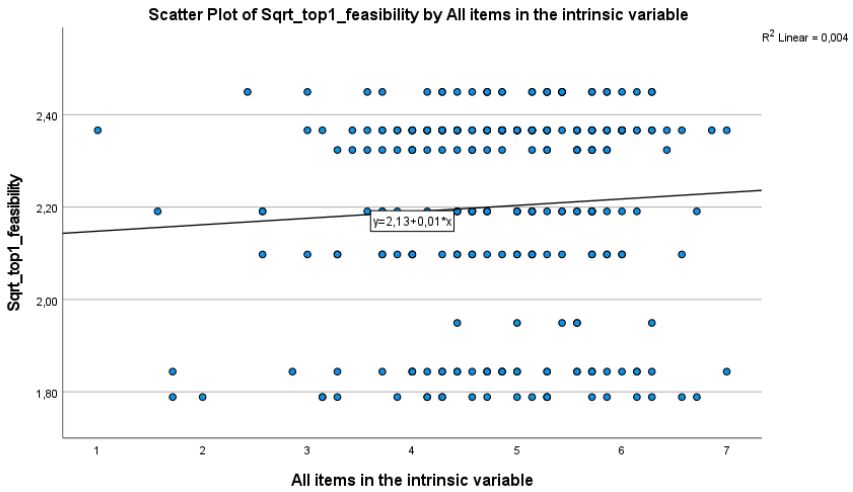
Logarithm of the DV Top1_originality with the IV extrinsic motives. No linearity.



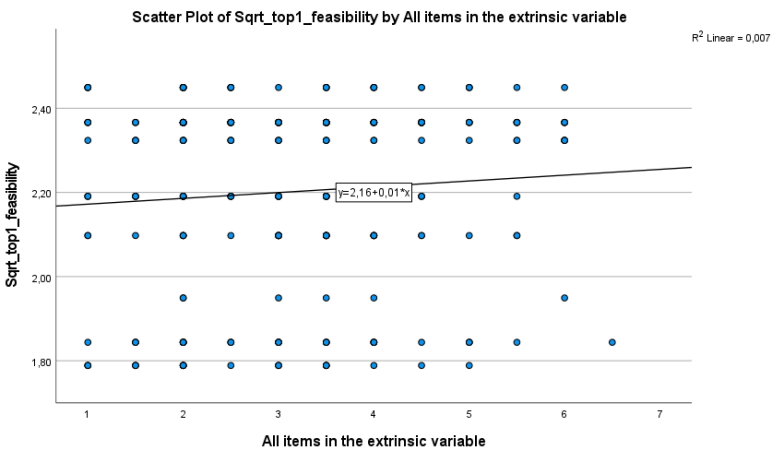
Inverse of the DV Top1_originality with the IV intrinsic motives. No linearity.



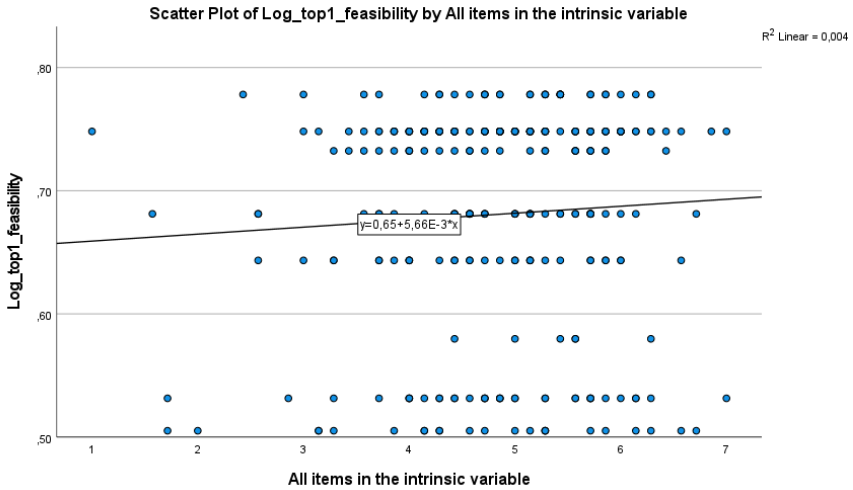
Inverse of the DV Top1_originality with the IV extrinsic motives. No linearity.



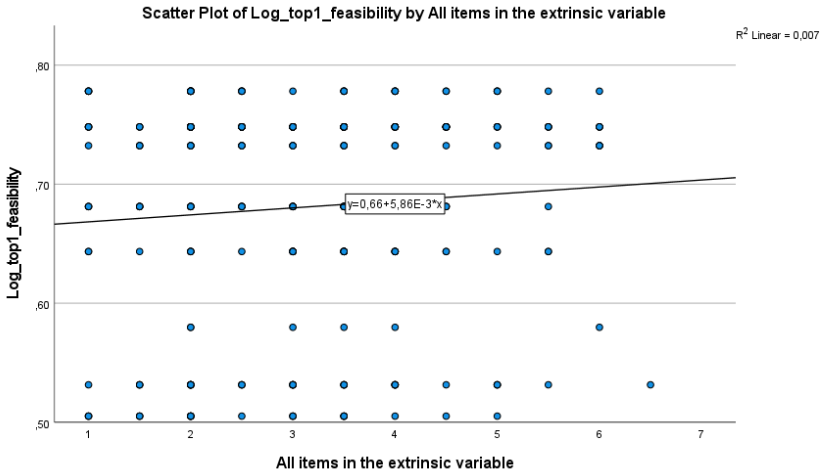
Square of the DV Top1_feasibility with the IV intrinsic motives. No linearity.



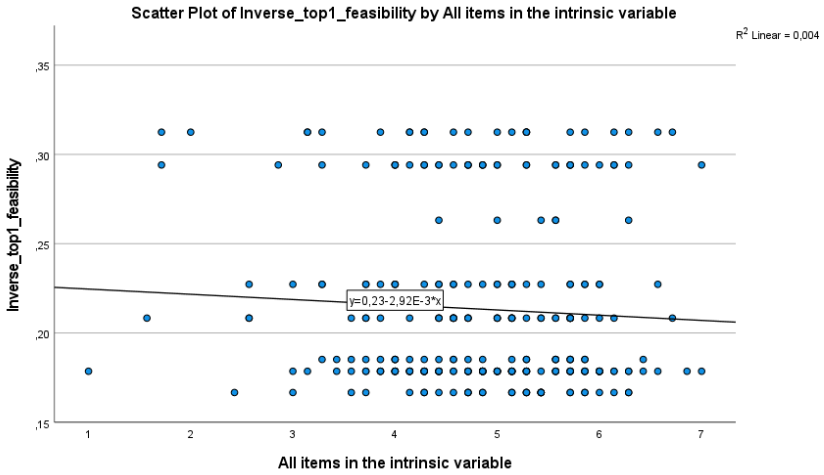
Square of the DV Top1_feasibility with the IV extrinsic motives. No linearity.



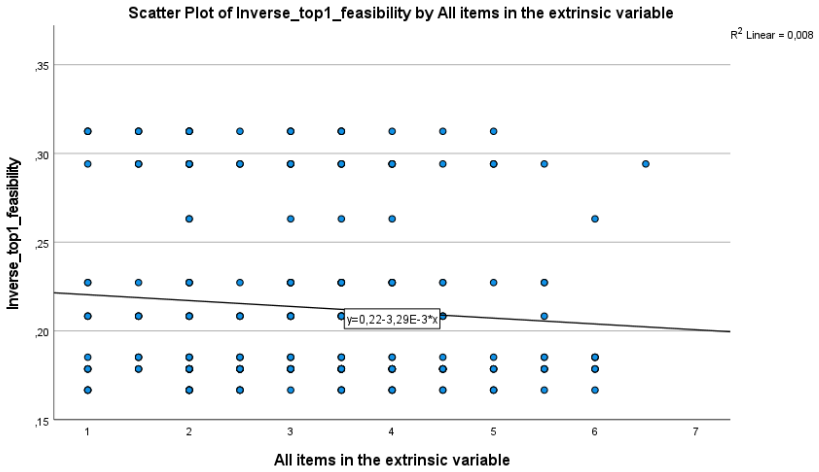
Logarithm of the DV Top1_feasibility with the IV intrinsic motives. No linearity.



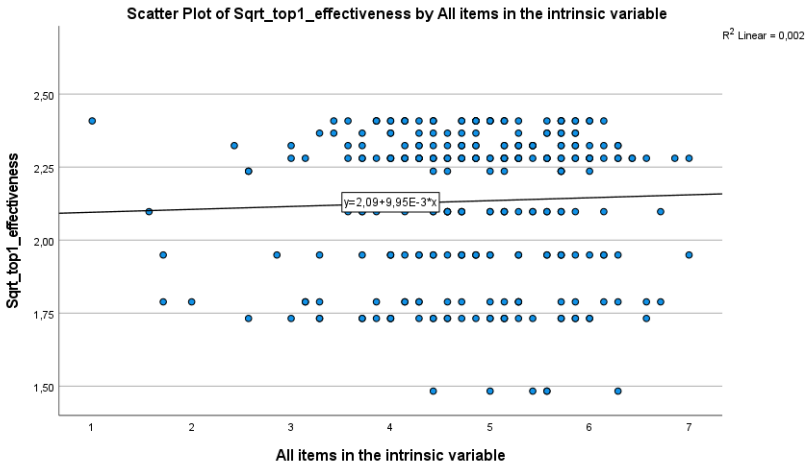
Logarithm of the DV Top1_feasibility with the IV extrinsic motives. No linearity.



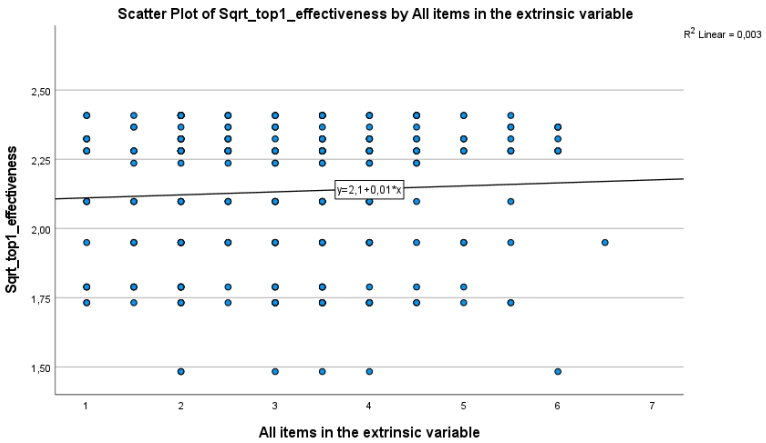
Inverse of the DV Top1_feasibility with the IV intrinsic motives. No linearity.



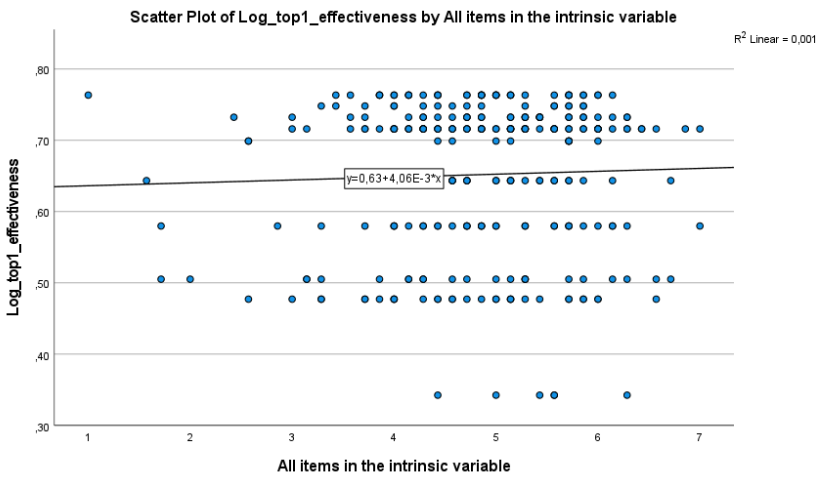
Inverse of the DV Top1_feasibility with the IV extrinsic motives. No linearity.



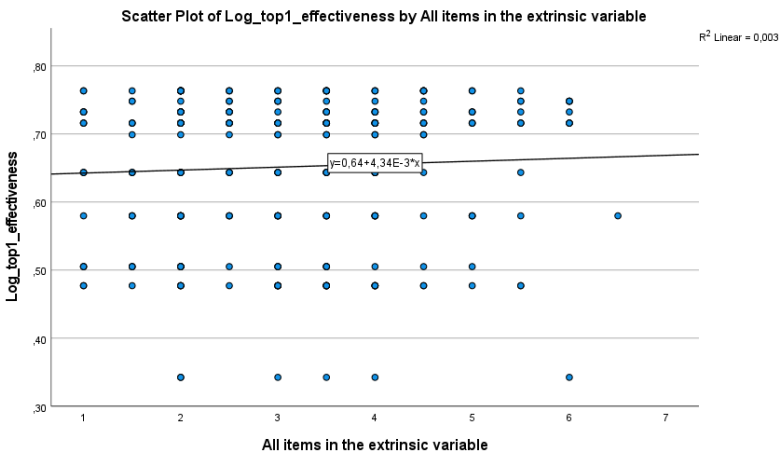
Square of the DV Top1_effectiveness with the IV intrinsic motives. No linearity.



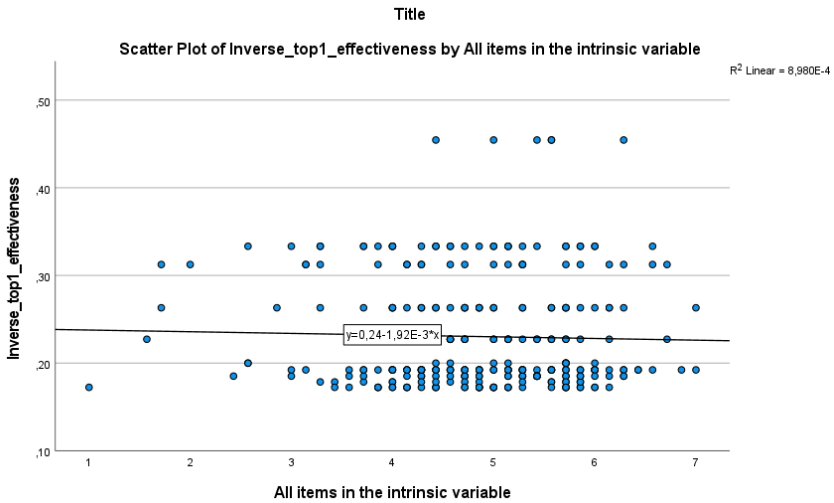
Square of the DV Top1_effectiveness with the IV extrinsic motives. No linearity.



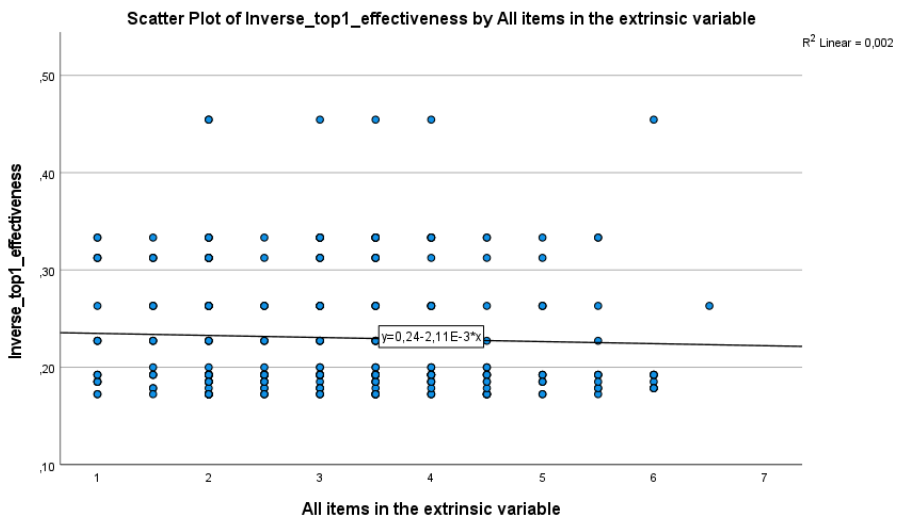
Logarithm of the DV Top1_effectiveness with the IV intrinsic motives. No linearity.



Logarithm of the DV Top1_effectiveness with the IV extrinsic motives. No linearity.



Inverse of the DV Top1_effectiveness with the IV intrinsic motives. No linearity.



Inverse of the DV Top1_effectiveness with the IV extrinsic motives. No linearity.

Conclusion of linearity with transforming the DV's

Concluding, the transformations of the DV's (totalscore_creativity, totalsore_originality, totalscore-feasibility, totalscore_effectiveness, top1_creativity, top1_orginality, top1_feasibility, top1_effectiveness) with squares, logarithms and inverse, did not result in linearity.

DV: Total score Creativity

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,509	,087		51,548	,000		
	All items in the intrinsic variable	,002	,016	,008	,134	,894	,991	1,009
	All items in the extrinsic variable	-,016	,013	-,076	-1,290	,198	,991	1,009

a. Dependent Variable: Total score average Creativity

The multicollinearity can be checked by looking at the VIF and Tolerance in the Coefficients table. VIF should be below 10 and the Tolerance should be above 0,2. VIF = 1,009 for both IV's and Tolerance is 0,991 for both IV's. The assumption of no multicollinearity is therefore met for DV Totalscore_Creativity.

Assumption 3 The values of the residuals are independent

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,076[a]	,006	-,001	,27657	2,026

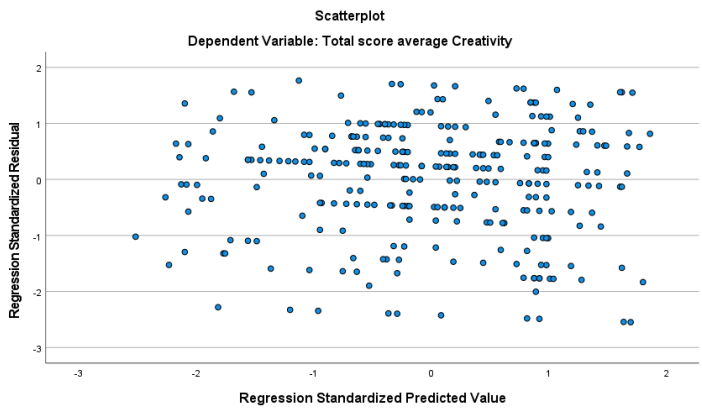
a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Creativity

This assumption is tested with the Durbin-Watson test, and the outcome of this test should be close to 2 and at least bigger than 1 and lower then 3. The value is 2,026 so the assumption that the residuals should be independent is met for DV Totalscore_Creativity.

Assumption 4 Homoscedasticity

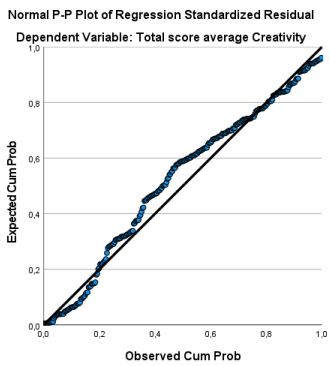
The variance of the residuals should be constant. This is tested by looking at the scatterplot.



There is no pattern in the scatter plot which entails it is a random array of dots, and therefore it can be concluded that the assumption of homoscedasticity has been met for DV Totalscore_Creativity and means that the variation of the residuals is constant.

Assumption 5 Normality

The values of the residuals should be normally distributed. This is checked by looking at the P-plot.



The dots should be close to the line, the closer the dots are to the line, the closer to normal the residuals are distributed. Not all the dots are as close to the line as preferred, this entails that it is possible that this assumption is violated. Therefore, this should be interpreted with caution. This entails that it is possible that not all the values of the residuals are normally distributed.

Assumption 6 No influential cases biasing the model

Cook's distance is used to see whether there are no influential cases biasing the model. All the values for each respondent should be below 1, otherwise it could be an outlier. All the values in this data set are below 1 and therefore there are no influential cases biasing the model for DV Totalscore_Creative.

DV: Total score Originality

with the same settings as for DV Totalscore_Creativity.

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,193	,215		19,532	,000		
	All items in the intrinsic variable	-,017	,040	-,024	-,413	,680	,991	1,009
	All items in the extrinsic variable	-,042	,031	-,080	-1,344	,180	,991	1,009

a. Dependent Variable: Total score average Originality

VIF = 1,009 for both IV's (<10) and Tolerance = 0,991 (>0,2) for both IV's which means multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

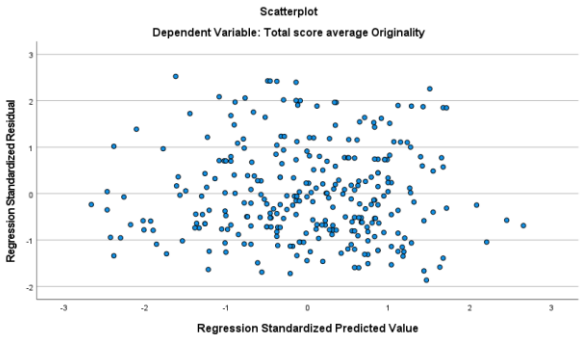
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,085[a]	,007	,000	,67868	1,963

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Originality

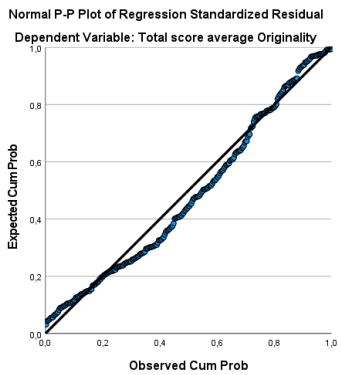
Durbin-Watson = 1,963 which is close to 2, and therefore assumption 3, residuals are independent, is met.

Assumption 4 Homoscedasticity



The scatterplot looks like a random array of dots, and therefore the assumption of homoscedasticity is met.

Assumption 5 Normality



The dots are close to the line, but not all dots are on the line, therefore it is possible that the assumption is violated, and this should be interpreted with caution.

Assumption 6 No influential cases biasing the model

All the Cook's distribution values are below 1 and therefore is the assumption of no influential cases biasing the model been met.

DV: Total score Feasibility

with the same settings as for DV Totalscore_Creativity.

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,747	,191		24,889	,000		
	All items in the intrinsic variable	,012	,036	,020	,330	,741	,991	1,009
	All items in the extrinsic variable	,034	,028	,073	1,225	,222	,991	1,009

a. Dependent Variable: Total score avererage Feasibility

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

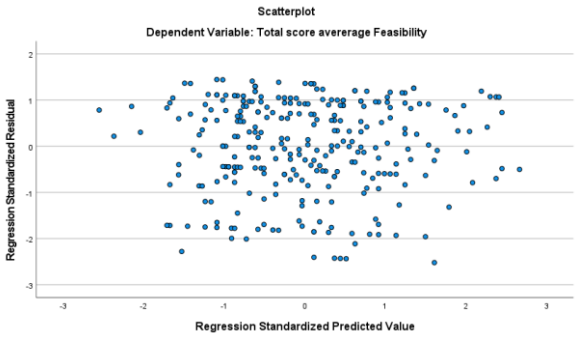
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,077[a]	,006	-,001	,60303	2,003

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score avererage Feasibility

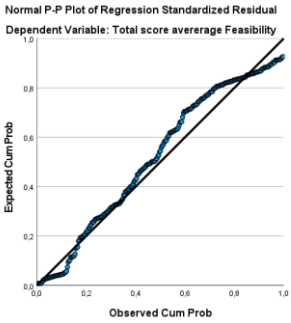
Durbin-Watson = 2,003 which is close to the wanted value of 2, therefore the assumption that the values of the residuals are independent is met.

Assumption 4 Homoscedasticity



The dots are randomly distributed and therefore the assumption of homoscedasticity is met.

Assumption 5 Normality



The dots are close to the line but not all the dots are on the line, therefore, it is possible that this assumption is violated, and this data should be interpreted carefully.

Assumption 6 No influential cases biasing the model

The Cook's distribution values are all below 1 and therefore the assumption of no influential cases biasing the model is met.

DV: Total score Effectiveness

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,458	,230		19,419	,000		
	All items in the intrinsic variable	,013	,043	,018	,302	,763	,991	1,009
	All items in the extrinsic variable	,038	,033	,068	1,140	,255	,991	1,009

a. Dependent Variable: Total score average Effectiveness

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

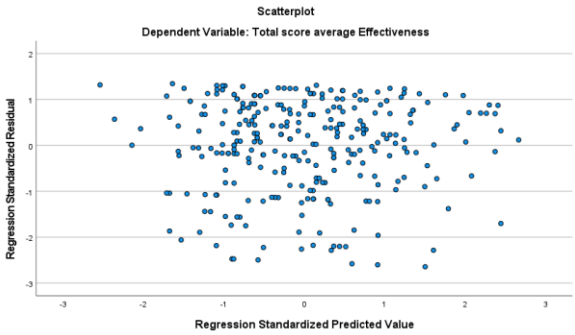
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,071[a]	,005	-,002	,72580	2,096

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Effectiveness

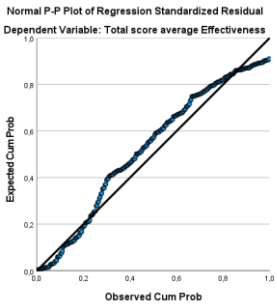
Durbin-Watson = 2,096 which is close to the wanted 2, and therefore, the assumption that the values of the residuals are independent is met.

Assumption 4 Homoscedasticity



The dots are randomly distributed and therefore the assumption of homoscedasticity is met.

Assumption 5 Normality



The dots are close to the line but not all the dots are on the line, therefore, it could be the case that the assumption of normality is violated, and the data should be interpreted carefully.

Assumption 6 No influential cases biasing the model

all the values of Cook's distribution are below 1 and therefore, the assumption of no influential cases biasing the model is met.

DV: Top 1 Creativity

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,496	,138		32,675	,000		
	All items in the intrinsic variable	,006	,026	,013	,224	,823	,991	1,009
	All items in the extrinsic variable	-,005	,020	-,015	-,252	,801	,991	1,009

a. Dependent Variable: Top 1 average Creativity

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

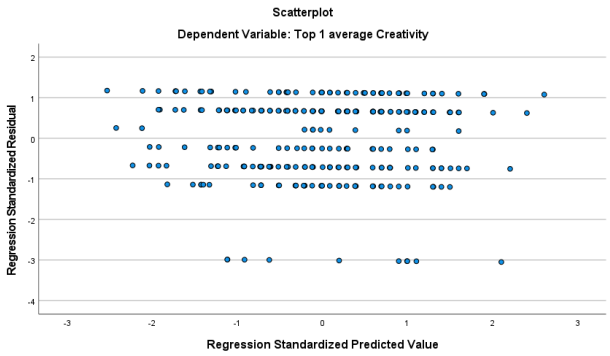
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,019[a]	,000	-,007	,43504	1,939

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Creativity

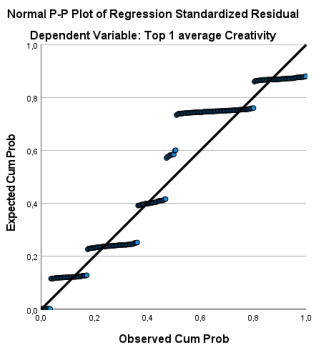
Durbin-Watson = 1,939 which is close to the wanted 2 and therefore the assumption that the values of the residuals are independent are met.

Assumption 4 Homoscedasticity



The dots are not randomly distributed and therefore the assumption of homoscedasticity is not met, but the data is heteroscedastic.

Assumption 5 Normality



The dots are not on the line and therefore, this data is not normally distributed, and this assumption is violated.

Assumption 6 No influential cases biasing the model

The values of Cook's distribution are all below 1 and therefore, the assumption that no influential cases biasing the model is met.

DV: Top 1 Originality

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,373	,328		13,329	,000		
	All items in the intrinsic variable	-,031	,062	-,030	-,509	,611	,991	1,009
	All items in the extrinsic variable	-,063	,047	-,079	-1,334	,183	,991	1,009

a. Dependent Variable: Top 1 averege Originality

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

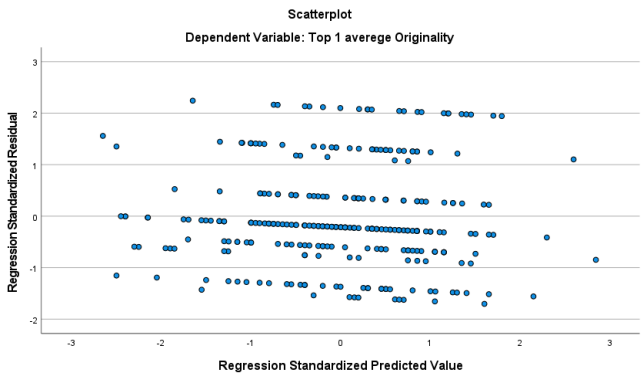
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,087[a]	,008	,001	1,03727	1,951

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 averege Originality

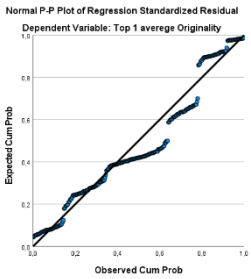
Durbin-Watson = 1,951 which is close to the wanted 2 and therefore the assumption that the values of the residuals are independent are met.

Assumption 4 Homoscedasticity



The dots are not randomly distributed and therefore the assumption of homoscedasticity is not met, but the data is heteroscedastic.

Assumption 5 Normality



The dots are not on the line and therefore, this data is not normally distributed, and this assumption is violated.

Assumption 6 No influential cases biasing the model

The values of Cook's distribution are all below 1 and therefore, the assumption that no influential cases biasing the model is met.

DV: Top 1 Feasibility

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,470	,295		15,174	,000		
	All items in the intrinsic variable	,054	,055	,057	,966	,335	,991	1,009
	All items in the extrinsic variable	,053	,043	,073	1,239	,216	,991	1,009

a. Dependent Variable: Top 1 average Feasibility

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

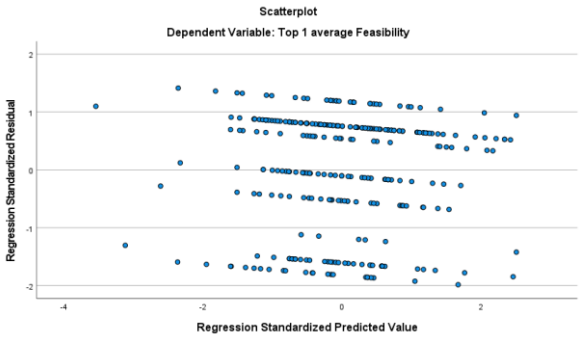
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,097[a]	,009	,002	,93129	2,010

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Feasibility

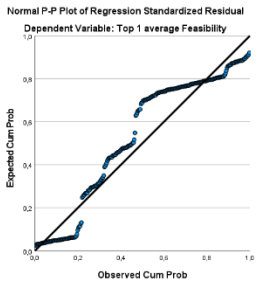
Durbin-Watson = 2,010 which is close to the wanted 2 and therefore the assumption that the values of the residuals are independent are met.

Assumption 4 Homoscedasticity



The dots are not randomly distributed and therefore the assumption of homoscedasticity is not met, but the data is heteroscedastic.

Assumption 5 Normality



The dots are not on the line and therefore, this data is not normally distributed, and this assumption of normality is violated.

Assumption 6 No influential cases biasing the model

The values of Cook's distribution are all below 1 and therefore, the assumption that no influential cases biasing the model is met.

DV: Top 1 Effectiveness

Assumption 2 Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	4,301	,324		13,260	,000		
	All items in the intrinsic variable	,036	,061	,035	,597	,551	,991	1,009
	All items in the extrinsic variable	,044	,047	,055	,936	,350	,991	1,009

a. Dependent Variable: Top 1 average Effectiveness

VIF = 1,009 (<10) and Tolerance = 0,991 (>0,2) and therefore the assumption of multicollinearity is met.

Assumption 3 Values of the residuals are independent

Model Summary[b]

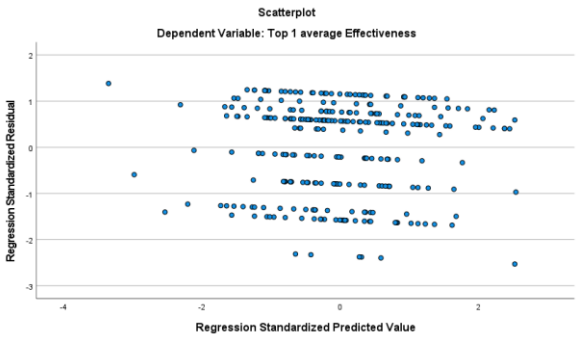
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,068[a]	,005	-,002	1,02539	2,048

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Effectiveness

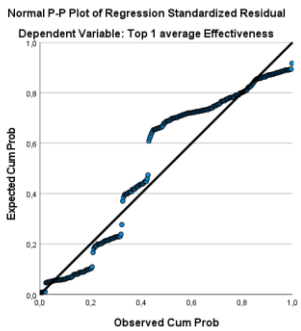
Durbin-Watson = 2,048 which is close to the wanted 2 and therefore the assumption that the values of the residuals are independent are met.

Assumption 4 Homoscedasticity



The dots are not randomly distributed and therefore the assumption of homoscedasticity is not met, but the data is heteroscedastic.

Assumption 5 Normality



The dots are not on the line and therefore, this data is not normally distributed, and this assumption of normality is violated.

Assumption 6 No influential cases biasing the model

The values of Cook's distribution are all below 1 and therefore, the assumption that no influential cases biasing the model is met.

Appendix 5 Multiple Regression Analysis

Multiple regression with DV 'Total score Creativity'

Correlations

		Total score average Creativity	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Total score average Creativity	1,000	,001	-,076
	All items in the intrinsic variable	,001	1,000	,094
	All items in the extrinsic variable	-,076	,094	1,000
Sig. (1-tailed)	Total score average Creativity	.	,495	,100
	All items in the intrinsic variable	,495	.	,055
	All items in the extrinsic variable	,100	,055	.
N	Total score average Creativity	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV totalscore_Creativity. r = 0,001 for intrinsic motives and r = -,078 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV totalscore_creativity and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,076[a]	,006	-,001	,27657

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Creativity

R = 0,076 which is the strength of the relationship between all of the IV's and the DV totalscore_creativity, and 0,076 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,006 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,006 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,127	2	,064	,832	,436[b]
	Residual	21,876	286	,076		
	Total	22,003	288			

a. Dependent Variable: Total score average Creativity

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,436 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the totalscore_creativity, which is the selection accuracy for selecting a top 3 of creative ideas, F(2,286) = 0,832, p = 0,436.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,509	,087		51,548	,000
	All items in the intrinsic variable	,002	,016	,008	,134	,894
	All items in the extrinsic variable	-,016	,013	-,076	-1,290	,198

a. Dependent Variable: Total score average Creativity

The coefficient table shows a significance level of p=0,894 (>0,05) for intrinsic motives and a significance level of p=0,198 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV totalscore_creativity. The B values show that when intrinsic motives go up with one unit, totalscore_creativity (the selection accuracy for selecting a top 3 creative ideas) goes up with 0,002 units, and when extrinsic motives go up with one unit, totalscore_creativity goes down with 0,016 units. Intrinsic motives influence the totalscore_creativity positively and extrinsic motives influence the totalscore_creativity negatively (but this is not significant).

Multiple regression with DV 'Total score Originality

A multiple regression analysis is performed for the DV Totalscore_Originality, this results in the following output.

Correlations

		Total score average Originality	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Total score average Originality	1,000	-,032	-,082
	All items in the intrinsic variable	-,032	1,000	,094
	All items in the extrinsic variable	-,082	,094	1,000
Sig. (1-tailed)	Total score average Originality	.	,294	,083
	All items in the intrinsic variable	,294	.	,055
	All items in the extrinsic variable	,083	,055	.
N	Total score average Originality	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV totalscore_Originality. r = -0,032 for intrinsic motives and r = -,082 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV totalscore_originality and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,085[a]	,007	,000	,67868

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Originality

R = 0,085 which is the strength of the relationship between all of the IV's and the DV totalscore_originality, and 0,085 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,007 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,007 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,968	2	,484	1,050	,351[b]
	Residual	131,735	286	,461		
	Total	132,702	288			

a. Dependent Variable: Total score average Originality

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,351 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the totalscore_originality, which is the selection accuracy for selecting a top 3 of original ideas, F(2,286) = 1,050, p = 0,351.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,193	,215		19,532	,000
	All items in the intrinsic variable	-,017	,040	-,024	-,413	,680
	All items in the extrinsic variable	-,042	,031	-,080	-1,344	,180

a. Dependent Variable: Total score average Originality

The coefficient table shows a significance level of p=0,680 (>0,05) for intrinsic motives and a significance level of p=0,180 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV totalscore_originality. The B values show that when intrinsic motives go up with one unit, totalscore_originality (the selection accuracy for selecting a top 3 original ideas) goes down with 0,017 units, and when extrinsic motives go up with one unit, totalscore_originality goes down with 0,042 units. Intrinsic motives and extrinsic motives influence the totalscore_originality negatively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 3 of original ideas. The results of the regression showed that the model explained only 0,7% of the variance and that the model is not a significant predictor of the selection accuracy of selecting a top three of creative ideas, F(2,286) = 1,050, p = 0,351. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV 'Total score Feasibility'

A multiple regression analysis is performed for the DV Totalscore_Feasibility, this results in the following output.

Correlations

		Total score avererage Feasibility	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Total score avererage Feasibility	1,000	,026	,074
	All items in the intrinsic variable	,026	1,000	,094
	All items in the extrinsic variable	,074	,094	1,000
Sig. (1-tailed)	Total score avererage Feasibility	.	,328	,104
	All items in the intrinsic variable	,328	.	,055
	All items in the extrinsic variable	,104	,055	.
N	Total score avererage Feasibility	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV totalscore_Feasibility. r = 0,026 for intrinsic motives and r = 0,074 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV totalscore_feasibility and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,077[a]	,006	-,001	,60303

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score avererage Feasibility

R = 0,077 which is the strength of the relationship between all of the IV's and the DV totalscore_feasibility, and 0,077 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,006 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,006 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,618	2	,309	,850	,429[b]
	Residual	104,003	286	,364		
	Total	104,621	288			

a. Dependent Variable: Total score avererage Feasibility

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,429 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the

totalscore_feasibility, which is the selection accuracy for selecting a top 3 of feasible ideas, F(2,286) = 0,850, p = 0,429.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,747	,191		24,889	,000
	All items in the intrinsic variable	,012	,036	,020	,330	,741
	All items in the extrinsic variable	,034	,028	,073	1,225	,222

a. Dependent Variable: Total score avererage Feasibility

The coefficient table shows a significance level of p=0,741 (>0,05) for intrinsic motives and a significance level of p=0,222 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV totalscore_feasibility. The B values show that when intrinsic motives go up with one unit, totalscore_feasibility (the selection accuracy for selecting a top 3 feasible ideas) goes up with 0,012 units, and when extrinsic motives go up with one unit, totalscore_feasibility goes up with 0,034 units. Intrinsic motives and extrinsic motives influence the totalscore_feasibility positively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 3 of feasible ideas. The results of the regression showed that the model explained only 0,6% of the variance and that the model is not a significant predictor of the selection accuracy of selecting a top three of feasible ideas, F(2,286) = 0,850, p = 0,429. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV ‘Total score Effectiveness’

A multiple regression analysis is performed for the DV Totalscore_Effectiveness, this results in the following output.

Correlations

		Total score average Effectiveness	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Total score average Effectiveness	1,000	,024	,069
	All items in the intrinsic variable	,024	1,000	,094
	All items in the extrinsic variable	,069	,094	1,000
Sig. (1-tailed)	Total score average Effectiveness	.	,341	,120
	All items in the intrinsic variable	,341	.	,055
	All items in the extrinsic variable	,120	,055	.
N	Total score average Effectiveness	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV totalscore_Effectiveness. r = 0,024 for intrinsic motives and r = 0,069 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV totalscore_effectiveness and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,071[a]	,005	-,002	,72580

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Total score average Effectiveness

R = 0,071 which is the strength of the relationship between all of the IV's and the DV totalscore_effectiveness, and 0,071 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,005 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,005 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,774	2	,387	,734	,481[b]
	Residual	150,660	286	,527		
	Total	151,434	288			

a. Dependent Variable: Total score average Effectiveness

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,481 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the totalscore_effectiveness, which is the selection accuracy for selecting a top 3 of effective ideas, F(2,286) = 0,734, p = 0,481.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,458	,230		19,419	,000
	All items in the intrinsic variable	,013	,043	,018	,302	,763
	All items in the extrinsic variable	,038	,033	,068	1,140	,255

a. Dependent Variable: Total score average Effectiveness

The coefficient table shows a significance level of p=0,763 (>0,05) for intrinsic motives and a significance level of p=0,255 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV totalscore_effectiveness. The B values show that when intrinsic motives go up with one unit, totalscore_effectiveness (the selection accuracy for selecting a top 3 effective ideas) goes up with 0,013 units, and when extrinsic motives go up with one unit, totalscore_effectiveness goes up with 0,038 units. Intrinsic motives and extrinsic motives influence the totalscore_effectiveness positively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 3 of effective ideas. The results of the regression showed that the model explained only 0,5% of the variance and that the model is not a significant predictor of the selection accuracy of selecting a top three of effective ideas, F(2,286) = 0,734, p = 0,481. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV 'Top 1 Creativity'

A multiple regression analysis is performed for the DV Totalscore_Effectiveness, this results in the following output.

Correlations

		Top 1 average Creativity	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Top 1 average Creativity	1,000	,012	-,014
	All items in the intrinsic variable	,012	1,000	,094
	All items in the extrinsic variable	-,014	,094	1,000
Sig. (1-tailed)	Top 1 average Creativity	.	,420	,408
	All items in the intrinsic variable	,420	.	,055
	All items in the extrinsic variable	,408	,055	.
N	Top 1 average Creativity	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV Top1_Creativity. r = 0,012 for intrinsic motives and r = -0,014 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV top1_creativity and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,019[a]	,000	-,007	,43504

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Creativity

R = 0,019 which is the strength of the relationship between all of the IV's and the DV top1_creativity, and 0,019 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,000 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,000 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,020	2	,010	,052	,949[b]
	Residual	54,129	286	,189		
	Total	54,148	288			

a. Dependent Variable: Top 1 average Creativity

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,949 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the top1_creativity, which is the selection accuracy for selecting a top 1 creative idea, F(2,286) = 0,052, p = 0,949.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,496	,138		32,675	,000
	All items in the intrinsic variable	,006	,026	,013	,224	,823
	All items in the extrinsic variable	-,005	,020	-,015	-,252	,801

a. Dependent Variable: Top 1 average Creativity

The coefficient table shows a significance level of p=0,823 (>0,05) for intrinsic motives and a significance level of p=0,801 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV top1_creativity. The B values show that

when intrinsic motives go up with one unit, top1_creativity (the selection accuracy for selecting a top 1 most creative idea) goes up with 0,006 units, and when extrinsic motives go up with one unit, top1_creativity goes down with 0,005 units. Intrinsic motives influence the top1_creativity positively and extrinsic motives influence the top1_creativity negatively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 1 of the most creative idea. The results of the regression showed that the model explained 0% of the variance and that the model is not a significant predictor of the selection accuracy of selecting the top 1 most creative idea, F(2,286) = 0,052, p = 0,949. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV 'Top 1 Originality'

A multiple regression analysis is performed for the DV Top1_Originality, this results in the following output.

Correlations

		Top 1 averege Originality	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Top 1 averege Originality	1,000	-,038	-,082
	All items in the intrinsic variable	-,038	1,000	,094
	All items in the extrinsic variable	-,082	,094	1,000
Sig. (1-tailed)	Top 1 averege Originality	.	,263	,083
	All items in the intrinsic variable	,263	.	,055
	All items in the extrinsic variable	,083	,055	.
N	Top 1 averege Originality	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV Top1_Originality. r = -0,38 for intrinsic motives and r = -0,082 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV top1_originality and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,087[a]	,008	,001	1,03727

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 averege Originality

R = 0,087 which is the strength of the relationship between all of the IV's and the DV top1_originality, and 0,087 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,008 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,008 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2,352	2	1,176	1,093	,337[b]
	Residual	307,715	286	1,076		
	Total	310,067	288			

a. Dependent Variable: Top 1 averege Originality

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,337 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the top1_originality, which is the selection accuracy for selecting a top 1 original idea, F(2,286) = 1,093, p = 0,337.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,373	,328		13,329	,000
	All items in the intrinsic variable	-,031	,062	-,030	-,509	,611
	All items in the extrinsic variable	-,063	,047	-,079	-1,334	,183

a. Dependent Variable: Top 1 averege Originality

The coefficient table shows a significance level of p=0,611 (>0,05) for intrinsic motives and a significance level of p=0,183 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV top1_originality. The B values show that when intrinsic motives go up with one unit, top1_originality (the selection accuracy for selecting a top 1 most original idea) goes down with 0,031 units, and when extrinsic motives go up with one unit, top1_originality goes down with 0,063 units. Intrinsic motives influence and extrinsic motives influence the top1_originality negatively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 1 of the most original idea. The results of the regression showed that the model explained only 0,8% of the variance and that the model is not a significant predictor of the selection accuracy

of selecting the top 1 most original idea, F(2,286) = 1,093, p = 0,337. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV 'Top 1 Feasibility'

A multiple regression analysis is performed for the DV Top1_Feasibility, this results in the following output.

Correlations

		Top 1 average Feasibility	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Top 1 average Feasibility	1,000	,064	,079
	All items in the intrinsic variable	,064	1,000	,094
	All items in the extrinsic variable	,079	,094	1,000
Sig. (1-tailed)	Top 1 average Feasibility	.	,139	,091
	All items in the intrinsic variable	,139	.	,055
	All items in the extrinsic variable	,091	,055	.
N	Top 1 average Feasibility	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV Top1_Feasibility. r = 0,064 for intrinsic motives and r = 0,079 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV top1_feasibility and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,097[a]	,009	,002	,93129

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Feasibility

R = 0,097 which is the strength of the relationship between all of the IV's and the DV top1_feasibility, and 0,097 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,009 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,009 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2,356	2	1,178	1,358	,259[b]
	Residual	248,049	286	,867		
	Total	250,406	288			

a. Dependent Variable: Top 1 average Feasibility

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,259 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the top1_feasibility, which is the selection accuracy for selecting a top 1 feasible idea, F(2,286) = 1,178, p = 0,259.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,470	,295		15,174	,000
	All items in the intrinsic variable	,054	,055	,057	,966	,335
	All items in the extrinsic variable	,053	,043	,073	1,239	,216

a. Dependent Variable: Top 1 average Feasibility

The coefficient table shows a significance level of p=0,335 (>0,05) for intrinsic motives and a significance level of p=0,216 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV top1_feasibility. The B values show that when intrinsic motives go up with one unit, top1_feasibility (the selection accuracy for selecting a top 1 most feasible idea) goes up with 0,054 units, and when extrinsic motives go up with one unit, top1_feasibility goes up with 0,053 units. Intrinsic motives influence and extrinsic motives influence the top1_feasibility positively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 1 of the most feasible idea. The results of the regression showed that the model explained only 0,9% of the variance and that the model is not a significant predictor of the selection accuracy of selecting the top 1 most feasible idea, F(2,286) = 1,178, p = 0,259. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Multiple regression with DV 'Top 1 Effectiveness'

A multiple regression analysis is performed for the DV Top1_Effectiveness, this results in the following output.

Correlations

		Top 1 average Effectiveness	All items in the intrinsic variable	All items in the extrinsic variable
Pearson Correlation	Top 1 average Effectiveness	1,000	,041	,059
	All items in the intrinsic variable	,041	1,000	,094
	All items in the extrinsic variable	,059	,094	1,000
Sig. (1-tailed)	Top 1 average Effectiveness	.	,246	,160
	All items in the intrinsic variable	,246	.	,055
	All items in the extrinsic variable	,160	,055	.
N	Top 1 average Effectiveness	289	289	289
	All items in the intrinsic variable	289	289	289
	All items in the extrinsic variable	289	289	289

The correlation matrix shows the correlation between the IV's and the DV Top1_Effectiveness. r = 0,041 for intrinsic motives and r = 0,059 for extrinsic motives. Therefore, can be concluded there is no correlation between the DV top1_effectiveness and the IV's intrinsic motives and extrinsic motives.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,068[a]	,005	-,002	1,02539

a. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

b. Dependent Variable: Top 1 average Effectiveness

R = 0,068 which is the strength of the relationship between all of the IV's and the DV top1_effectiveness, and 0,068 is very low, which suggest that this model is not a good predictor of the outcome. The R square value is 0,005 which indicates the proportion of the variation of the DV that can be explained by the IV's, and 0,005 is very low, therefore, the correlation of this DV is not explained by the IV's intrinsic motives and extrinsic motives.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1,417	2	,709	,674	,510[b]
	Residual	300,709	286	1,051		
	Total	302,127	288			

a. Dependent Variable: Top 1 average Effectiveness

b. Predictors: (Constant), All items in the extrinsic variable, All items in the intrinsic variable

The significance of the ANOVA should be smaller than 0,05, sig. = 0,510 > 0,05 and therefore, not significant. Therefore, the regression model does not significantly predict the

top1_effectiveness, which is the selection accuracy for selecting a top 1 effective idea, F(2,286) = 0,674, p = 0,510.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4,301	,324		13,260	,000
	All items in the intrinsic variable	,036	,061	,035	,597	,551
	All items in the extrinsic variable	,044	,047	,055	,936	,350

a. Dependent Variable: Top 1 average Effectiveness

The coefficient table shows a significance level of p=0,551 (>0,05) for intrinsic motives and a significance level of p=0,350 (>0,05) for extrinsic motives. This entails that both variables do not significantly contribute to the model for the DV top1_effectiveness. The B values show that when intrinsic motives go up with one unit, top1_effectiveness (the selection accuracy for selecting a top 1 most effective idea) goes up with 0,036 units, and when extrinsic motives go up with one unit, top1_effectiveness goes up with 0,044 units. Intrinsic motives and extrinsic motives influence the top1_effectiveness positively (but this is not significant).

Concluding, a multiple regression analysis was carried out to investigate whether intrinsic motives and extrinsic motives significantly predict the selection accuracy of selecting a top 1 of the most effective idea. The results of the regression showed that the model explained only 0,5% of the variance and that the model is not a significant predictor of the selection accuracy of selecting the top 1 most effective idea, F(2,286) = 0,674, p = 0,510. Both intrinsic and extrinsic motives did not significantly contribute to the model.

Appendix 6 The Survey

The survey was conducted together with other students, only the questions relevant for this research are shown in this appendix. First the expert survey is presented and thereafter the respondent survey.

6.1 Expert survey

Welcome!

If you want to fill in the questionnaire in English, press the "-->" button on the bottom right of this page to start the questionnaire.

Wanneer u de vragenlijst in het Nederlands in wilt vullen, selecteer "*Nederlands*" in het drop-down menu rechtsboven, voordat u op de knop "-->" klikt om met de vragenlijst te starten.

Welcome!

You are invited as an expert to participate in a research project replicating a co-creation setting between an organization and consumers. Specifically, the project will focus on evaluating and selecting ideas to make packaging more sustainable.

This research project is conducted by six Master students (Jeffrey Habraken, Naima Mait, Dewanti Meijer, Nienke Scheper, Lisa ter Steege, and Tjitske Vervloed) from Radboud University (Nijmegen School of Management) and their supervisor (Ilona Weeterings).

The procedure involves completing an online survey. The questions concern the evaluation of twelve ideas based on four dimensions (creativity, originality, feasibility, and effectiveness), followed by a selection task. Finally, a number of questions are asked about your expertise. Completing the survey will take approximately 10 minutes. On the top of the screen, you can find a progress bar indicating your progress in the completion of the survey.

Confidentiality of survey data

The research data will be recorded anonymously and stored securely according to Radboud University's research data management guidelines and in accordance with the General Data Protection Regulation (GDPR). The researchers involved in this research will use the research data for master theses, academic publications, and presentations. The anonymous data may become available in the framework of Open Science so that other researchers can refer to it and reuse the data. In the interest of research integrity, the research data will be accessible to the academic community for a period of at least ten years.

Voluntary participation

Your participation in this study is voluntary. This means that you can stop and withdraw your participation and consent at any time during the data collection period, without giving a reason.

Further information

It is easiest to complete the questionnaire on a PC or laptop.

If you have any questions regarding this study, now or in the future, or would like to receive the results of the study, please contact Ilona Weeterings (ilona.weeterings@ru.nl).

By selecting "*Yes, I agree to participate in the study as described above*", you indicate that:

- You have read and understood this information.
- You voluntarily agree to participate.
- You realize that you may discontinue this study at any time.
- You are at least 18 years old.

If you do not wish to participate in this study, you can decline participation by selecting "No, I do not agree to participate in the study" below.

- Yes I agree to participate in the study as described above
- No, I do not agree to participate in the study

You have now entered the co-creation section of our questionnaire. Please read the context description below, before moving on to the next page.

Governments, industry, and the general public realize the importance of behaving socially responsible. To assure peace and welfare for people and the planet, now and in the future, the UN (United Nations) has formulated seventeen sustainable development goals (SDG). In order to achieve these goals, fundamental changes should be made in the way societies produce and consume, which is captured in the UN's SDG number twelve. Organizations can contribute to this goal by developing new products, processes, services, and technologies that deliver environmental and social performance in both the short and long term, while at the same time improving economic performance as well.

One specific way in which organizations can contribute to this goal is by using sustainable packaging. Simply put, this is packaging that decreases the environmental footprint and harms the environment as little as possible. To create sustainable packaging, there are different aspects one can think about, e.g., the material that is used, minimizing the production and distribution, and extending the lifetime and usability of packaging.

Therefore, the central question in this co-creation process is: *What are more sustainable packaging solutions?*

In a previous stage, multiple ideas were generated to answer the central question. We have made a pre-selection of ideas varying in originality, feasibility, and effectiveness (both high and low on these dimensions).

We will first provide you with an overview of the 12 ideas, after which you will be asked to evaluate each of the ideas. Thereafter, you will be asked to select three of them.

The following set of ideas is a pre-selection coming from an idea generation session. These ideas vary in originality, feasibility, and effectiveness (both high and low on these dimensions). As preparation for the evaluation and selection task, you can <u>briefly</u> go over the 12 ideas. You don't have to memorize the ideas, because they will be shown again in the evaluation and selection task.

Turning origami paper wrapping into art: Products are wrapped in origami paper. This packaging contains varying instructions to fold an origami figure from the packaging, for example, a crane, frog, or lotus flower. This way, waste is turned into art, so that the paper can be used longer.

Packaging as a measuring instrument: The packaging can also be used as a scale with sensors that send small electric pulses through the product you place on it. Because different nutrients (e.g., fats, carbohydrates, proteins) conduct electricity differently, a nutritional score can be calculated that determines how healthy the product is.

Sustainable grocery shopping nets: To reduce the use of plastic bags in supermarkets, they are being removed from all over the store. Instead, consumers buy reusable, sustainable nets in which, for example, loose vegetables, fruits, or bread can be packed. The consumer will take these bags with them again next time.

No packaging if not necessary: Many products are sold in packaging while this packaging is not necessary. By removing this packaging, the packaging material is saved. Examples of products that can be sold without packaging are shoes without a box or sandwiches to-go without packaging.

Customized packaging: The packaging machine scans the dimensions of the ordered products (this works for one or more products at the same time) and folds one cardboard box around it. As a result, the packaging is smaller, less packaging material is needed, and the packaging contains as little empty air as possible so that filling material is not necessary.

Merging orders: There is a parcel locker in every neighbourhood where residents can collect their orders. All orders placed at the same store are placed in one reusable crate. This crate is used by the parcel deliverer to deliver the products to the parcel locker. The crate is then taken back and reused.

Edible or solvable packaging: These are products that are packaged in materials that are edible

or dissolve when used so that no residual waste remains. For example, think of coffee cups made of biscuits and chocolate, which you can eat after drinking the coffee, or soap capsules made of seaweed that dissolve in the shower.

Plants from packaging material: The products are packed in degradable paper containing seeds. After the product has been unpacked, the paper can be moistened, after which it can be planted in the ground. Make sure to provide enough water to keep the paper moist. After a while, the paper dissolves, and plants grow where the paper is planted.

Feathers as insulating packaging: There is an enormous surplus of feathers in the poultry industry. An important characteristic of feathers is that they are strong, light, and insulating. That is why feathers are very suitable for keeping cooled food at the right temperature. Instead of delivering products in Styrofoam cooler boxes, packaging made from feathers can be used.

Bring your own packaging: The products are offered without packaging and the consumer takes their own packaging from home to put the products in. Think, for example, of pasta, cereals, and spreads that you put in your own jar in the supermarket, coffee-to-go in your own mug, and your takeaway order at a restaurant in your own container.

Use more sustainable materials: Most packaging is made of paper or oil-based plastic. However, more alternatives are possible. Think of packaging made from renewable raw materials (e.g., sugar cane, bamboo, fungi), bio-waste (e.g., fruit peels, eggshells), or residual products from production (e.g., tall oil, fibers).

Returning a deposit at the train station: A deposit is requested on small plastic bottles and cans. To encourage people to recycle these bottles/cans instead of throwing them away, they can be handed in at the deposit machines at train stations. Consumers get the deposit back by scanning a QR code with which the money is deposited directly into their account.

In this part, you are asked to select the three most creative ideas out of the 12 ideas you have carefully read and evaluated. Again, note that an idea is considered creative when it meets three criteria – originality, feasibility, and effectiveness:

- Originality: an idea that is novel, unusual, and new to the market.
- Feasibility: an idea that the company is able to create and is worthwhile for them to launch.
- Effectiveness: an idea that is able to decrease the environmental footprint and harm the environment as less as possible.

Please select the three ideas that you believe are most creative.

Please rank the three ideas you selected in the previous question from most to least creative.

Put the most creative idea at the top (1) and the least creative idea at the bottom (3), with the other option in the middle (2).

Important: you can drag and drop the ideas to change the order.

- The 12 ideas

Please select your field of expertise (more than 1 answer possible)

- Sustainability
- Packaging
- Innovation
- Other, namely ….

How many years of experience do you have in your field of expertise (as selected in the previous question)?

….

What is/was your most recent job title?

….

What industry are you currently active in?

- Finance and insurance
- Transportation and warehousing
- Real estate, rental, and leasing
- Arts, entertainment, and recreation
- Administration, business support, and waste management services
- Mining
- Retail
- Wholesale trade
- Agriculture, forestry, fishing, and hunting
- Construction
- Educational services
- Healthcare and social assistance
- Information and communication
- Manufacturing
- Energy
- Other, namely ….

We thank you for your time spent taking this survey.

Your response has been recorded.

6.2 Respondent survey

Welcome!

If you want to fill in the questionnaire in English, press the "-->" button on the bottom right of this page to start the questionnaire.

Wanneer u de vragenlijst in het Nederlands in wilt vullen, selecteer "*Nederlands*" in het drop-down menu rechtsboven, voordat u op de knop "-->" klikt om met de vragenlijst te starten.

Welcome!

You are invited to participate in a research project replicating a co-creation setting between an organization and consumers. Specifically, the project will focus on evaluating and selecting ideas to make packaging more sustainable.

This research project is conducted by six Master students (Jeffrey Habraken, Naima Mait, Dewanti Meijer, Nienke Scheper, Lisa ter Steege, and Tjitske Vervloed) from Radboud University (Nijmegen School of Management) and their supervisor (Ilona Weeterings).

The procedure involves completing an online survey. The first questions will cover different personality traits, motivations, and value orientations. These questions are followed by an explanation of the co-creation setting, and an evaluation and selection task. Finally, three demographic questions are asked. This survey will take approximately 15 minutes to complete. On the top of the screen, you can find a progress bar indicating your progress in the completion of the survey.

Confidentiality of survey data

The research data will be recorded anonymously and stored securely according to Radboud University's research data management guidelines and in accordance with the General Data Protection Regulation (GDPR). The researchers involved in this research will use the research data for master theses, academic publications, and presentations. The anonymous data may become available in the framework of Open Science so that other researchers can refer to it and reuse the data. In the interest of research integrity, the research data will be accessible to the academic community for a period of at least ten years.

Voluntary participation

Your participation in this study is voluntary. This means that you can stop and withdraw your participation and consent at any time during the data collection period, without giving a reason.

Further information

It is easiest to complete the questionnaire on a PC or laptop.

If you have any questions regarding this study, now or in the future, or would like to receive the results of the study, please contact Ilona Weeterings (ilona.weeterings@ru.nl).

By selecting "*Yes, I agree to participate in the study as described above*", you indicate that:

- You have read and understood this information.
- You voluntarily agree to participate.
- You realize that you may discontinue this study at any time.
- You are at least 18 years old.

If you do not wish to participate in this study, you can decline participation by selecting "No, I do not agree to participate in the study" below.

- Yes I agree to participate in the study as described above
- No, I do not agree to participate in the study

The following questions are about reasons why you would participate in a co-creation setting (= *interaction between an organization and consumers in the new product/service development process*) in general, and not about this specific study.

Please rate the statements below on a scale ranging from strongly disagree to strongly agree.

“I would be more willing to participate in co-creation, because.. "

- I am curious

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I enjoy keeping up with new innovations and new ideas

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I like to support innovative ideas that contribute to a more sustainable world

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I would like to improve the idea evaluation / selection of sustainable innovations

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I would like to gain more knowledge about sustainable innovations

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I would like to get in touch with the researchers

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I believe in the norms and values for sustainable development

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I would like to gain social status

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

- I would like to gain a financial reward for participation

1)Strongly disagree; 2) disagree; 3) somewhat disagree; 4) neither agree, 5) nor disagree; 6) somewhat agree; 7) agree; strongly agree

You have now entered the co-creation section of our questionnaire. Please read the context description below, before moving on to the next page.

Governments, industry, and the general public realize the importance of behaving socially responsible. To assure peace and welfare for people and the planet, now and in the future, the UN (United Nations) has formulated seventeen sustainable development goals (SDG). In order to achieve these goals, fundamental changes should be made in the way societies produce and consume, which is captured in the UN's SDG number twelve. Organizations can contribute to this goal by developing new products, processes, services, and technologies that deliver environmental and social performance in both the short and long term, while at the same time improving economic performance as well.

One specific way in which organizations can contribute to this goal is by using sustainable packaging. Simply put, this is packaging that decreases the environmental footprint and harms the environment as little as possible. To create sustainable packaging, there are different aspects one can think about, e.g., the material that is used, minimizing the production and distribution, and extending the lifetime and usability of packaging.

Therefore, the central question in this co-creation process is: *What are more sustainable packaging solutions?*

In a previous stage, multiple ideas were generated to answer the central question. We have made a pre-selection of ideas varying in originality, feasibility, and effectiveness (both high and low on these dimensions).

We will first provide you with an overview of the 12 ideas, after which you will be asked to evaluate each of the ideas. Thereafter, you will be asked to select three of them.

The following set of ideas is a pre-selection coming from an idea generation session. These ideas vary in originality, feasibility, and effectiveness (both high and low on these dimensions). As preparation for the evaluation and selection task, you can briefly go over the 12 ideas. You don't have to memorize the ideas, because they will be shown again in the evaluation and selection task.

Turning origami paper wrapping into art: Products are wrapped in origami paper. This packaging contains varying instructions to fold an origami figure from the packaging, for example, a crane, frog, or lotus flower. This way, waste is turned into art, so that the paper can be used longer.

Packaging as a measuring instrument: The packaging can also be used as a scale with sensors that send small electric pulses through the product you place on it. Because different nutrients (e.g., fats, carbohydrates, proteins) conduct electricity differently, a nutritional score can be calculated that determines how healthy the product is.

Sustainable grocery shopping nets: To reduce the use of plastic bags in supermarkets, they are being removed from all over the store. Instead, consumers buy reusable, sustainable nets in which, for example, loose vegetables, fruits, or bread can be packed. The consumer will take these bags with them again next time.

No packaging if not necessary: Many products are sold in packaging while this packaging is not necessary. By removing this packaging, the packaging material is saved. Examples of products that can be sold without packaging are shoes without a box or sandwiches to-go without packaging.

Customized packaging: The packaging machine scans the dimensions of the ordered products (this works for one or more products at the same time) and folds one cardboard box around it. As a result, the packaging is smaller, less packaging material is needed, and the packaging contains as little empty air as possible so that filling material is not necessary.

Merging orders: There is a parcel locker in every neighbourhood where residents can collect their orders. All orders placed at the same store are placed in one reusable crate. This crate is used by the parcel deliverer to deliver the products to the parcel locker. The crate is then taken back and reused.

Edible or solvable packaging: These are products that are packaged in materials that are edible or dissolve when used so that no residual waste remains. For example, think of coffee cups made of biscuits and chocolate, which you can eat after drinking the coffee, or soap capsules made of seaweed that dissolve in the shower.

Plants from packaging material: The products are packed in degradable paper containing seeds. After the product has been unpacked, the paper can be moistened, after which it can be planted in the ground. Make sure to provide enough water to keep the paper moist. After a while, the paper dissolves, and plants grow where the paper is planted.

Feathers as insulating packaging: There is an enormous surplus of feathers in the poultry industry. An important characteristic of feathers is that they are strong, light, and insulating. That is why feathers are very suitable for keeping cooled food at the right temperature. Instead of delivering products in Styrofoam cooler boxes, packaging made from feathers can be used.

Bring your own packaging: The products are offered without packaging and the consumer takes their own packaging from home to put the products in. Think, for example, of pasta, cereals, and spreads that you put in your own jar in the supermarket, coffee-to-go in your own mug, and your takeaway order at a restaurant in your own container.

Use more sustainable materials: Most packaging is made of paper or oil-based plastic. However, more alternatives are possible. Think of packaging made from renewable raw materials (e.g., sugar cane, bamboo, fungi), bio-waste (e.g., fruit peels, eggshells), or residual products from production (e.g., tall oil, fibers).

Returning a deposit at the train station: A deposit is requested on small plastic bottles and cans. To encourage people to recycle these bottles/cans instead of throwing them away, they can be handed in at the deposit machines at train stations. Consumers get the deposit back by scanning a QR code with which the money is deposited directly into their account.

In this part, you are asked to select the three most creative ideas out of the 12 ideas you have carefully read and evaluated. Again, note that an idea is considered creative when it meets three criteria – originality, feasibility, and effectiveness:

- Originality: an idea that is novel, unusual, and new to the market.
- Feasibility: an idea that the company is able to create and is worthwhile for them to launch.
- Effectiveness: an idea that is able to decrease the environmental footprint and harm the environment as less as possible.

Please select the <u>three</u> ideas that you believe are most creative.

- The 12 ideas

Please rank the three ideas you selected in the previous question from most to least creative.

Put the most creative idea at the top (1) and the least creative idea at the bottom (3), with the other option in the middle (2).

Important: you can drag and drop the ideas to change the order.

- The three selected ideas

What is your gender?

- Male
- Female
- I identify myself as ….
- I prefer not to say

What is your age (in years)?

…

What is your highest completed educational level?

- Primary school
- vmbo (high school)
- havo or vwo year 1-3 (high school)
- havo or vwo year 4-6 (high school)
- mbo1
- mbo2, mbo3, or mbo4
- hbo bachelor or wo bachelor
- hbo master or wo master
- doctor
- Other, namely ….

We thank you for your time spent taking this survey.

Your response has been recorded.

Appendix 7 items Fernandes and Remelhe (2016)

The items from the study of Fernandes and Remelhe (2016):

Intrinsic motives

- I am curious
- I enjoy to keep up with new ideas and innovations
- I like experiencing new and different products
- I enjoy experiencing new software/apps/games
- I like to support innovative products

Knowledge motives

- To improve my skills in software development
- To improve software/apps that I use or will use in the future
- To introduce ideas to the developers of these applications

Social motives

- To meet other users who share similar interests
- To get in touch with developers of these applications
- Because I believe in the values and norms of FS communities
- To share ideas about software/apps

Financial motives

- Because I expected a monetary compensation for my participation
- Because I am interested in the offered rewards (e.g., special offers/prices)

Willingness to engage

- In the future I intend to continue to participate in NPD
- I plan to make future contributions to these projects
- I continue believing these projects are important to me