

Firm Feedback and Peer Feedback in Ideation Contests

**A study of the influence of firm feedback and peer feedback on continuance
intention in future ideation contests.**



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Abstract

The purpose of this study is to investigate the effect of firm feedback and peer feedback on continuance intention in future ideation contests. So far, these two types of feedback had not been studied together in one study. To generate many ideas in subsequent contests, continuous participation by consumers in these ideation contests is of great importance.

A 2x2 factorial design was used in which four scenarios were created. Participants were exposed to firm feedback, peer feedback, both types of feedback, or none. A survey was used in which a story about a hypothetical contest was provided. Participants had to indicate their agreement on a scale measuring continuance intention in future ideation contests.

Regarding the findings, no main effect of firm feedback was found, a marginally significant main effect of peer feedback was found, and a significant interaction effect was found. Giving peer feedback did not affect continuance intention when firm feedback was present. When firm feedback was absent, giving peer feedback resulted in a higher continuance intention.

Concerning theoretical implications, the interaction effect demonstrated that the effect of one feedback type on the continuance intention depends on the presence of the other. This illustrates the importance of studying them together.

Regarding the practical implications, this study shows that when increasing continuance intention is a firm's goal, providing peer feedback and not giving firm feedback is the best option.

Keywords: Ideation contests, firm feedback, peer feedback, continuance intention

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1. Introduction

In today's competitive environment, it is essential for companies to stay innovative in order to be able to remain in a competitive position. The need to come up with solutions for problems companies are facing is an essential occupation. Firms are more frequently relying on external sources to create opportunities since it gives the firms access to a broad pool of solvers from which they cannot profit when relying on internal sources (Terwiesch & Xu, 2008). Companies 'co-create' value with the help of customers through the use of ideation contests, a form of co-creation. Ideation contests are defined as 'an invitation of an organizer – namely, a firm – to a general public or a targeted group to submit contributions to a certain topic within a predefined period of time' (Leimeister et al., 2009, p. 200). These ideation contests contain a seeker, the company, and a solver, the consumer (Jain & Deodhar, 2022). Solvers need to create a solution for the stated problem, whereas the company, the seeker, decides upon a winner (Leimeister et al., 2009).

The company's aim of an ideation contest is to provide them with a large number of ideas, as well as high-quality ideas that could contribute to innovation. It is of great importance for companies to create the right atmosphere for solvers to be able to come up with valuable ideas that could successfully contribute to innovation. Prior research has investigated the role of co-creation experience for seekers in ideation contests (Füller et al., 2010). Which was found to be an important factor that contributes to the submission, as well as the quality of ideas.

However, many ideation contests still fail to become a success. This can be caused by ideas that are not valuable to the company or even harm the company's reputation by destructive deviant content (Gatzweiler et al., 2017). Furthermore, a disappointing number of submitted ideas could result in too little input for the firm, which could decrease the success of the ideation contest. In order to organize a successful ideation contest, it is of great importance to enhance active participation, in which solvers fulfill the task and make a contribution to the ideation contest (Leimeister et al., 2009). This active participation remains important after a particular contest ends and the participant will take part in a new ideation contest. To specify, Boons et al. (2015) discovered that without active participation, the number of participants in ideation contests will not only decrease after the current contest but also in future ideation contests organized by the company.

Furthermore, Hofstetter et al. (2018) discovered that participants that do not gain any reward out of the contest are less likely to participate in subsequent ideation contests, which could negatively affect the continuance intention in future ideation contests. Hofstetter et al.

(2018) argue that feedback and rating are important in enhancing a solver's intention to participate in subsequent ideation contests and could therefore be seen as important antecedents of continuance intention in future ideation contests.

Moreover, Chan et al. (2015) found that this feedback influences the initial submission of ideas in crowdsourcing as well. The study analyzed two distinct forms of feedback, firm feedback and peer feedback, on the likelihood of idea submission in crowdsourcing communities. Although the effect of firm feedback, as well as the effect of peer feedback on submission in ideation contests and crowdsourcing communities, has been investigated (Chan et al, 2015; Deichmann et al., 2021; Jung et al., 2020; Jiang & Wang, 2020; Leimeister et al., 2014; Liao et al., 2017; Nohutlu et al., 2022; Wang et al., 2020;), the impact of these together on continuance intention in future ideation contests has not yet been investigated and could provide valuable insights.

According to Füller et al. (2010), companies aim to receive good quality ideas, whereas participants of the ideation contest value the presence co-creation experience. Studying the two forms of feedback in ideation contests together could increase benefits for both parties. Firm feedback could give guidelines for solvers to create ideas that are in line with the seeker's expectations. Whereas the presence of peer feedback could create more sense of community by giving the opportunity to co-create together with others. In the end, this could lead to a more successful ideation contest that generates more innovative and valuable ideas.

Hofstetter et al. (2018) investigated competence feedback from firms and peers in ideation contests by providing participants with ranking, not with personal feedback. However, Hofstetter et al. (2018) did not study the effects of firm feedback and peer feedback together in one study. Therefore, the current study will be theoretically relevant in expanding the current knowledge by studying both forms of feedback at the same time on continuance intention in ideation contests.

Regarding the practical relevance, this study could provide beneficial insights for managers on how to use firm feedback and peer feedback together in the management of ideation contests. Most studies focus on participation. However, the current study investigates continuance intention in future ideation contests, which was found to have a larger effect on the success of ideation contests in the long run than initial participation (Wu & Gong, 2021). This could be important in order to generate a large number of solvers that continue participating in future ideation contests, instead of dropping out after a contest ends. A higher number of participants in subsequent ideation contests will lead to more ideas which could create a competitive advantage for the firm (Schenk et al., 2019). Furthermore, Hofstetter et al. (2018)

stated that providing feedback to solvers is costly. The current study could provide insights into whether providing firm feedback could be a valuable investment, or if peer feedback has a more positive effect. Moreover, studying the effect of using both forms of feedback interchangeably and at the same time will provide insights into what combination is most effective in terms of continuance intention in future contests. In summary, firm feedback and peer feedback have proven importance in enhancing participation in current ideation contests and in future contests. Therefore, the present study will focus on these two antecedents together to investigate the effect they have individually and together on continuance intention in future ideation contests. The objective of the proposed study is to investigate the influence of firm feedback and peer feedback on continuance intention in ideation contests. The research question would state: *'To what extent do firm feedback, peer feedback, and these factors together influence continuance intention in future ideation contests?'*

The further outline of this thesis will be as follows. A theoretical background is provided in which theory will be further explained concerning ideation contests and open innovation. Moreover, what is already known about the importance of peer feedback and firm feedback is clarified. Furthermore, previous findings of firm feedback, peer feedback, as well as other relevant discoveries regarding ideation contests are discussed. Regarding the method, an experiment was conducted (2x2 factorial design) in which solvers in a hypothetical ideation contest were investigated regarding possible continuance intention in a future ideation contest organized by the same firm. Moreover, results, conclusions, and implications will be provided.

The current study will focus on the furniture industry, an industry that could profit from the use of ideation contests. As discussed, ideation contests create an opportunity for innovation with the help of external solvers (Terwiesch & Xu, 2008). Grzegorzewska & Wieckowska (2016) discovered that innovation is important to remain in a good competitive position in the furniture industry, an industry that is known for its competition. It could be valuable to address this issue by studying ideation contests. Ideation contests support innovation which could result in a stronger competitive advantage for firms in this industry.

In the current study, the fictional company name 'De Meubelwinkel' is used to decrease the possible biases and brand associations that participants may hold towards existing brands. The company represents a furniture company like 'IKEA'. IKEA already involves consumers to create solutions for certain problems. However, IKEA has not been involved in ideation contests. On their corporate website, IKEA explicitly demonstrates the importance of co-creation and working together. Hosting ideation contests could fit into this co-creative brand image IKEA wants to show its consumers.

2. Theoretical framework

2.1 Open Innovation

The competitive environment in which firms are operating requests frequent and continuous adapting in order to grow and stay profitable (Chesbrough, 2003a). One major factor that has been identified as the main driver for companies to sustain profitability is innovation (Elmquist et al., 2009). For a long period of time, firms argued that innovation should take place internally, a process that is referred to as ‘closed innovation’ which states that to be successful, innovation requires control by the company (Chesbrough, 2003a). However, Chesbrough (2003a) argues a shift in this innovation paradigm. As a result of the short shelf-life and the increasingly knowledgeable customers that contested the firm’s ability to profit from their own knowledge, closed innovation was challenged, resulting in the rise of open innovation. Open innovation is defined as “systematically encouraging and exploring a wide range of internal and external opportunities, consciously integrating that exploration with firm capabilities and resources, and broadly exploiting those opportunities through multiple channels” (West & Gallagher, 2006, p.1)

Open innovation could include a rich variety of practices. One approach of outsourcing innovation, or ideation, is crowdsourcing (Bayus, 2013). By the use of crowdsourcing, companies outsource the ideation task from an internal to an external approach, which allows actors outside the organization to participate in ideation. Crowdsourcing applications could take the form of a one-time contest, as well as an ongoing community in which participants are asked to continue proposing ideas for company improvements (Bayus, 2013). It is of great importance to distinguish between these types of ideations since these settings differ significantly. In one-time contests, there is a limited timeframe, and the ‘best idea’ is chosen as the winner (Bayus, 2013).

2.2 Crowdsourcing communities

Voluminous academic research has been conducted in order to discover manners in which these crowdsourcing communities could be as effective and valuable as possible for firms. Participants cooperating in crowdsourcing, frequently referred to as ‘solvers’, ought to originate ideas that are capable of solving the ideation problem that companies, often referred to as ‘seekers’, face. However, seekers often encounter difficulties in receiving useful contributions because solvers lack the expertise and motivation to produce useful contributions to the ideation problem (Acar, 2019).

2.3 Ideation contests

Whereas crowdsourcing communities are continuous platforms, that mostly rely on a third-party platform or website, ideation contests often take place on a proprietary platform (Schenk et al., 2019). Ideation contests taking place on proprietary platforms could generate a competitive advantage, whereas a crowd of ‘solvers’ in crowdsourcing communities could also be a resource for competing firms at low cost since these communities are available for other firms to access as well. In other words, by using ideation contests on proprietary platforms instead of crowdsourcing communities on third-party platforms, firms can create a competitive advantage (Schenk et al., 2019). Studying ideation contests may therefore be quite valuable for firms to gain a competitive advantage.

Ideation contests are defined as ‘an invitation of an organizer – namely, a firm – to a general public or a targeted group to submit contributions to a certain topic within a predefined period of time’ (Leimeister et al., 2009, p. 200). Such contests provide companies with the opportunity to engage with an external workforce that could come up with a broader spectrum of solutions for existing problems (Jain & Deodhar, 2022). This creates a vast amount of ideation opportunities that would not appear when a company only searches for ideation internally. Jain and Deodhar (2022) elaborated on the heterogeneity of the solvers that take part in ideation contests, which could affect the variety of ideas that are developed during the contest. This heterogeneity includes a diversity of participants ranging from ordinary consumers to creative professionals. This diversity could positively affect creativity in ideation contests, since it creates the opportunity for different types of ideas to emerge from different types of participants (Djelassi & Cambier, 2022).

However, the use of ideation contests could also include several pitfalls. By outsourcing ideation through the use of an ideation contest, the company could experience a loss of control in the ideation process. Control is given to a, mostly unknown, crowd of innovators that could possibly harm the company (Gatzweiler et al., 2017). As a result, this harmful use of the ideation contest could hinder the innovation process and damage the company’s reputation. An ideation contest that is not properly managed could result in the creation of deviant and negative ideas (Zare et al., 2019). Further elaborating on the management of ideation contests, careless management could result in negative feelings from participants of ideation contests. These negative feelings among participants could negatively affect their willingness to participate in the ideation contest (Hanine & Steils, 2019). In case participation is low, the contest will not be as successful in generating valuable ideas as it is intended to be.

In order to utilize the knowledge of the external crowd as much as possible, organizations need to be able to increase the likelihood of receiving suggestions and participation in ideation contests (Dahlander & Piezunka, 2014). In the recent past, academic research has focused on finding antecedents that could be able to influence participation in ideation contests. Füller et al. (2010) elaborated on the importance of co-creation experience in ideation competitions. It was discovered that a sense of community was important alongside the ideation task being autonomous, enjoyable, and competent. This sense of community created cooperation between participants of contests, which could lead to better ideas.

As discovered by Füller et al. (2010), an ideation task needs to contain certain elements like autonomy, enjoyability, and competence. Designing an ideation task is among the key challenges in stimulating participation, and participants investing more resources into crowdsourcing activities (Li et al., 2022). Regarding the design, an important consideration that could be considered is the presence of task instructions (Yin et al., 2022). In this research by Yin et al. (2022), the number of participants was affected by the presence of requirement-oriented writing and giving guidelines to participants. Participation is likely to be higher since the presence of task instruction could provoke solvers' interest in the contest.

A common problem encountered in the design of ideation contests is information asymmetry (Jiang & Wang, 2020). This information asymmetry occurs since ideation contests include broad tasks where seekers have certain preferences, but solvers do not obtain full information about these preferences. Jiang and Wang (2020) discovered that company feedback could play an informative role by eliminating information asymmetry and increasing solvers' efforts in ideation contests. As stated before, Füller et al. (2010) highlighted the importance of a certain sense of community. Besides the presence of firm interactions, solvers could experience interactions with other solvers as well. These interactions could affect the sense of community and could be favorable for individuals' innovation performance (Yang & Han, 2021). Because of the importance of these two 'supporting' factors, it will be elaborated on further in chapter 2.5.

2.4 Continuance intention

As discussed in the previous section, participation in ideation contests is a widely studied phenomenon that was found to have an influence on the success of the contest (Dahlander & Piezunka, 2014; Hanine & Steils, 2019; Schenk et al., 2019). Initial participation in ideation contests is an important start. However, a large portion of the participants will drop out after the contest ends and do not attend subsequent contests because of negative feelings and a lack

of receiving rewards (Hofstetter et al., 2018). Participants may lose trust in the company after the contest ends, which will hurt the long-term relationship between the company and the innovators (Wang et al., 2020). Sun et al. (2012) discovered that sustained participation is important since it can bring back participants that already have the experience to come up with more valuable ideas.

Moreover, Wu and Gong (2021) argue that sustained participation, or referred to as continuous participation intention, is of higher importance for the long-term viability of crowdsourcing. Therefore, studying factors that drive continuance participation intention rather than initial participation in ideation contests could provide valuable insights into how to design successful ideation contests over time and multiple times. Wu and Gong (2021) describe continuous participation intention as the extent of individuals' willingness to continue their participation in activities. In the present study, the working definition that is used is, 'the willingness of a solver to continue participating in future contests organized by the company.'

2.5 Feedback as supporting factors in ideation

Recently, research has focused on supporting factors in ideation contests that could be able to positively affect participation (Chan et al., 2015). The presence of firm feedback as well as peer feedback could affect participation in ideation contests. This subchapter will further elaborate on both 'supporting' factors and how they could possibly affect the continuance intention of participants in ideation contests.

Firm feedback

The first supporting factor that will be discussed is firm feedback. Firm feedback consists of comments a firm provides to customers participating in ideation (Chan et al., 2015). By providing feedback, seekers can demonstrate they support a learning-oriented culture, which positively affects their willingness to share ideas (Jung et al., 2020). Leimeister et al. (2014) emphasized that participants often take part in ideation contests to experience learning opportunities. This learning experience could be reinforced by the presence of firm feedback on ideas.

Firm feedback in ideation contests could also create more guidelines for solvers by providing feedback about the task and about what is requested. This could take away information asymmetry, resulting in a higher willingness of solvers to participate (Jiang & Wang, 2020). Furthermore, Liao et al. (2017) found that participation feedback could help guide solvers on appropriate conduct. As firm feedback has been demonstrated to positively influence

participation in ideation contests, it was also found to affect continuous participation in future contests. Wu and Gong (2021) discovered that feedback provided by the firm increases participants' extrinsic motivation because they will receive concrete information about the quality of their work, which increases continuance participation. Considering the findings of previous studies, the following hypothesis about the effect of firm feedback on continuance intention was formulated:

H1: There will be a positive main effect of firm feedback on continuance intention in ideation contests. Continuance intention will be higher when firm feedback is present than when it is absent in the ideation contest.

Peer feedback

In the study of Chan et al. (2015), social interactions with peers and the firm in crowdsourcing communities were investigated. Firm feedback has been discussed in the previous section but the influence of peer feedback in ideation contests has been investigated as well. Chan et al. (2015) argue that peer feedback frequently includes feedback from peer-to-peer. Whereas firm feedback is perceived as hierarchical, peer feedback is perceived as horizontal which could lead to different responses (Chan et al, 2021). Peer feedback was perceived as more important in order to receive social status and being able to show that a solver is capable of contributing valuable ideas.

An important characteristic of ideation contests is that it takes place in a competitive environment, which may result in participants being less willing to share their feedback with others in order not to provide competing participants with sufficient knowledge. Instead, companies should facilitate more collaboration to realize ideas (Deichmann et al., 2021). A suggestion was made that a company should provide the opportunity for participants in ideation contests to commit themselves to the ideas of others and create supporting ties as a form of peer feedback. Moreover, the engagement of peers, as well as support and appreciation gave positive feelings to other solvers which enhanced the willingness of these solvers to contribute and eventually participate (Nohutlu et al., 2022). Wang et al. (2020) described that high levels of 'peer interactivity' could enhance a better understanding of the task, which could lead to a more valuable idea generation, more motivation to participate, and higher trust in the platform. Mediated by the trust in the platform, peer feedback was found to positively affect continuance intention (Wang et al., 2020). Moreover, Steils and Hanine (2016) discovered that learning from others seems to influence participants' 'reparticipation' in future ideation contests. Therefore,

the following hypothesis about the effect of peer feedback on continuance intention was formulated for the present study:

H2: There will be a positive main effect of peer feedback on continuance intention in ideation contests. Continuance intention will be higher when peer feedback is present than when it is absent in the ideation contest.

As stated previously, Chan et al. (2015) investigated the influence of firm feedback and peer feedback in crowdsourcing communities, research on these supportive factors has been extended to the domain of ideation contests increasingly by several studies (Jung et al., 2020; Jiang & Wang, 2020; Wang et al., 2020; Deichmann et al., 2021). However, a combination of firm feedback and peer feedback and their effect on continuance intention in ideation contests has not yet been researched. Studying both types of feedback combined could provide organizers of ideation contests with knowledge on how to use both at the same time. Until now, knowledge only exists about the use of one type of feedback at a time. Koh (2018) studied the effects of peer support and firm support together on feedback use. The study found that the form of feedback in combination with the source, firm, or peer, is important. This demonstrates that peer feedback and firm feedback are perceived differently, therefore could be valuable to study their combined presence in ideation contests.

In the present study, the combination of firm feedback and peer feedback will be researched empirically. Both factors have been shown to positively influence idea participation in ideation contests separately. However, Chan et al. (2021) found that peer feedback was perceived as more important to participants when searching for social status. When both types of feedback are present, peer feedback could increase the effect of firm feedback in the case of furniture, since furniture is perceived as a social status marker (Dion & Borraz, 2017). Therefore, it is expected that the presence of peer feedback could influence the effect of firm feedback in an interaction effect. The following hypothesis has been formulated:

H3: There will be an interaction effect of firm feedback and peer feedback together on continuance intention in ideation contests. Continuance intention will be higher when both types of feedback are present, than when only one or no feedback is present.

2.6 Prior experience

The stated hypotheses and the underlying theory suggest that feedback could influence continuance intention in ideation contests. However, several factors could have an influence on consumers' continuance intention in ideation contests. Zare et al. (2019), explored the effects of multiple drivers that affect consumers' interest in ideation contests to discover a difference between different consumer segments. The study found that prior co-creation experience is an important predictor of consumers' willingness to co-create. Zare et al. (2019) discovered that prior experience with co-creation could affect future intention to participate. Therefore, prior experience with ideation contests could affect continuance intention in future contests as well. In the present study, prior experience with ideation contests is treated like a control variable since it could affect the continuance intention regardless of the effect of the different types of feedback.

2.7 Conceptual model

A conceptual model was created based on the three hypotheses and including the control variable 'prior experience'. All three hypotheses contain a positive effect, this is indicated by the 'plus' sign. The direction of the arrow is from the independent variables to the dependent variable since an effect on the dependent variable is hypothesized.

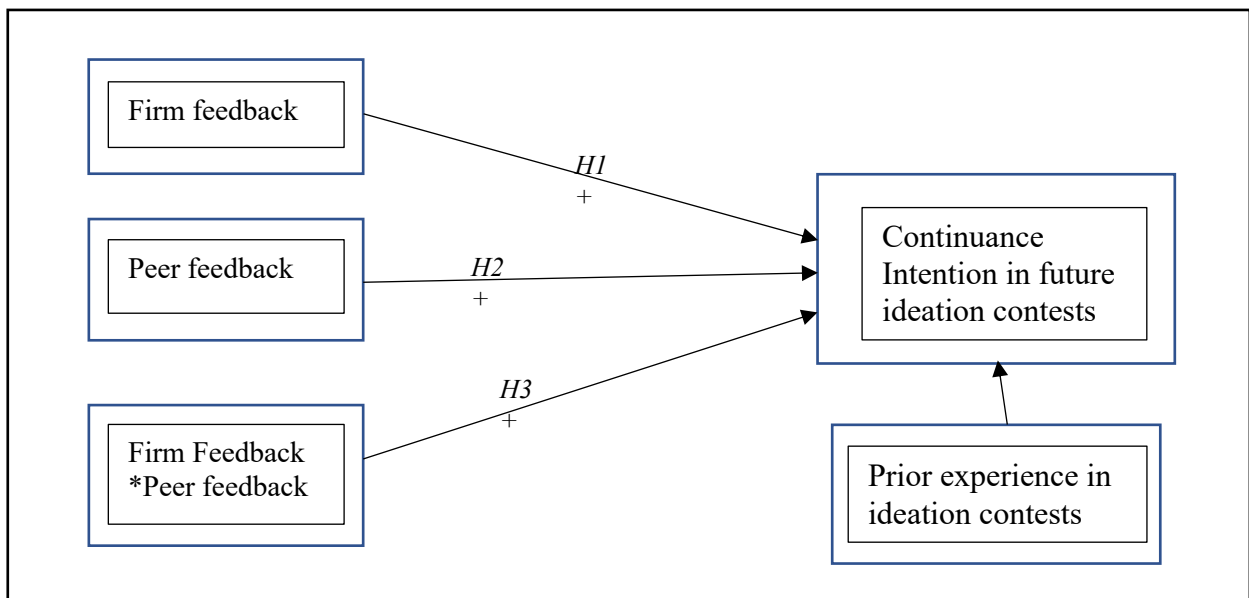


Figure 1: Conceptual model

3. Methodology

In this section, the methodological choices and applications will be elaborated. First, the method and the design will be introduced. Second, the sample and treatment of the sample will be discussed. Furthermore, the sources of data will be discussed. Thereafter, measures and operationalization of the independent variables and the dependent variable will be introduced. Next, the data analysis methods and the procedure will be elaborated. Finally, reliability and validity will be discussed, as well as limitations and ethics.

3.1 Method and design

The present study is interested in finding causal relationships between the independent variables firm feedback and peer feedback, and the dependent variable continuance intention. Therefore, an experiment will be conducted since an experiment is an appropriate method for identifying causal relationships and differences between groups (Hair et al., 2018). In this experiment, four groups were investigated. Each group was assigned to one of the four conditions which was done completely at random. The choice for an experiment gives allowance for the manipulation of more independent variables and assessment of their effects, as well as their combined effect, on the dependent variable. The independent variables were manipulated by the presence of different scenarios. The scenario included one independent variable (firm feedback or peer feedback), both independent variables and no independent variables (control group). Participants were randomly assigned to a scenario and were randomly exposed to either firm feedback, peer feedback, both types of feedback, and no feedback.

The study was designed according to a 2x2 factorial design. 'A factorial design examines the effect of several factors simultaneously by forming groups based on all possible combinations of levels of the various treatment variables' (Hair et al., 2018, p. 373). The levels of treatment will be discussed in the measures and operationalization section. Using this type of design provides an opportunity to examine the effects of both independent variables, firm feedback, and peer feedback, and their interaction effect on the dependent variable 'participation intention'. Furthermore, this design allows for the presence of a control group, which was exposed to a situation in which neither firm support nor peer support is used.

To ensure that the manipulation of the different scenarios had been understood by the participants of the study, a manipulation check was conducted after the participants participated in one of the four possible scenarios. This manipulation check will be further explained in the measures and operationalization section. Furthermore, the survey was created in English.

However, since this study is aimed at Dutch citizens and distributed in The Netherlands solely, the survey was translated from English into Dutch by the master thesis students. The choice to distribute it in Dutch among Dutch citizens was made with the aim to prevent biases regarding the language and possible cultural differences that could occur between different nationalities. To verify that this translation did not alter the original meaning of the survey, the Dutch survey was translated back into English by a former business administration student. This translation did not differ to a great extent from the original survey. Therefore, the Dutch survey was accepted for distribution. Lastly, an attention check was done with the help of a question to check whether the participant is paying attention to the survey to ensure higher validity of the answers (Appendix A).

3.2 Sample

The sample size of a study is an important methodological consideration. Using a sample that is too small could result in too little statistical power to identify statistically significant results (Hair et al., 2018). Regarding the sample size for the present study, Hair et al. (2018) suggests a sample size of a minimum of 30 per group, which will include 120 participants at least for this study. The study takes place in the Netherlands and included only Dutch natives from 18 years and older. Therefore, the survey had been completely in Dutch. As discussed in the previous section, the choice to distribute this survey solely in Dutch is made due to the possible influence of nationality on the outcome of the study. Moreover, the sample only includes participants of 18 years and older since this is the legal age required to be winning prizes in contests. The survey was distributed by means of Qualtrics and was shared via online communication like WhatsApp and LinkedIn. This convenience method was chosen due to the limited time and budget available for this thesis project. This type of non-probability sampling could result in a sampling bias in which external validity will be threatened. However, the distribution of gender, as well as education level did not differ to a great extent in the sample. Considering age groups, the group 18-25 was quite larger than the other groups which could be a limitation to the generalizability of the findings.

After the survey was closed, the obtained data was converted to SPSS for analysis. A total of 310 responses were registered during the survey. However, for the analysis, it was required that several responses were excluded. Firstly, it was important that respondents gave their consent for filling in this survey. Secondly, considering the study it was important that a participant had a Dutch nationality. Thirdly, an attention check was used to check whether a response was valid. After deleting responses that did not provide consent, did not have Dutch

nationality, and did not pass the attention check, 197 responses remained. After the manipulation check was analyzed and responses were deleted according to the procedure, which is elaborated in chapter 3.3, 165 respondents remained.

The final sample existed of 165 respondents, 67 men (40.6%), 97 women (58.8%), and one person that indicated non-binary (0.6%). Regarding age, the largest group existed of respondents between 18 and 25 years of age (49.7%), followed by respondents between 26 and 35 years of age (20.6%), the other groups were relatively small. Concerning age groups, 84 people studied at university (50.9%), 55 people have an HBO background (33.3%), 18 people have an MBO education (18.0%), and 6 people finished high school (3.6%).

Regarding the distribution of groups, the control group existed of 44 respondents (26.7%), the group that was exposed to the scenario containing firm feedback contained 39 respondents (23.6%), the peer feedback group existed of 37 respondents (22.4%), and the group that received firm feedback and peer feedback consisted of 45 respondents (27.3%). Moreover, 31 people indicated they have prior experience with ideation contests (18.8%), whereas 134 people did not have prior experience in ideation contests (81.2%).

3.3 Manipulation check

After being exposed to a certain scenario, it was tested whether the different types of feedback, firm feedback, and peer feedback, were perceived correctly by participants of the experiment. The participants were asked to indicate on a 5-point Likert scale to what extent they agree with three questions about the scenario. These three questions consist of, 'The scenario feels realistic', I can imagine how the feedback works in the online ideation contest, and 'I understand that I received feedback', either firm feedback, peer feedback, or both types of feedback.

With the remaining 197 responses, it was checked whether the manipulation check was successful with a procedure according to the following steps. Firstly, the manipulation check consisted of three questions for the firm feedback and peer feedback scenario, and four questions for the 'both' scenario. The question '*To what extent did you perceive you get feedback from the firm/from other participants*' was perceived as the most important indicator of whether the manipulation check was successful. Therefore, all respondents that scored 1 (totally disagree) or 2 (disagree) were excluded. After this exclusion, a composite mean score was calculated for the remaining respondents. Respondents that scored lower than 3 (neutral) on this composite score were excluded. This procedure resulted in 165 remaining valid responses.

3.4 Data sources

Data for this study was gathered by means of a survey. This survey was created and shared online via Qualtrics and had a duration of three weeks. It consisted of 11 questions including questions about the given scenario, as well as demographic questions. These questions will include questions about age and gender. A further explanation of the scenarios that will be used in the survey will be provided in the next section.

3.5 Measures and operationalization

In this study, two independent variables were used. These variables were, as mentioned earlier, 'firm feedback' and 'peer feedback'. One dependent variable was used, 'continuance intention'. In this section, the operationalization of these variables will be elaborated. For the present study, four different scenarios were created. The scenarios consisted of written text about the hypothetical ideation contest as explained previously. One scenario consisted of a text in which it will be explained that a participant participated in an ideation contest of 'De Meubelwinkel' and has received feedback from the firm. The second scenario consisted of a text which stated that a participant participated in an ideation contest of 'De Meubelwinkel' and received feedback from other participants. The third scenario consisted of a text that stated that a participant participated in an ideation contest of 'De Meubelwinkel' and received feedback from the firm, as well as from other participants. In the last scenario, the control group, it will be stated that a participant participated in an ideation contest of 'De Meubelwinkel', not mentioning firm feedback, or peer feedback. In summary, the different scenarios are the manipulation of the independent variables, which were manipulated by the presence of the different types of feedback or the absence of the types of feedback in a certain scenario. Next, it will be explained how the variables are operationalized.

3.5.1 Firm feedback

The independent variable firm feedback will be manipulated by presence or not in the scenario. This variable has two nominal levels which will be 'present' and 'not present'. The firm will provide a participant of the contest with feedback to the idea in the form of comments in line with Jiang and Wang (2020). Seeber et al. (2017) operationalized feedback in the form of number of comments posted. In line with Seeber et al. (2017), this study will make use of comments as operationalization of feedback. In case firm feedback is present, it will be stated in the text fragment in the survey that firms will provide feedback by means of comments

(Appendix A). These comments are based on examples from Chan et al. (2021). A manipulation check has checked whether participants recognize firm feedback by asking them a Likert scale question after they had read the scenario. This manipulation check is discussed in section 3.4.3.

3.5.2 Peer feedback

Regarding the other independent variable peer feedback, it will be operationalized by the use of comments from peers, according to the study by Seeber et al. (2017). Peer feedback will be manipulated by the presence or not in the scenario ('present' or 'not present'), similar to firm feedback. In the text fragment in the survey, it will be stated that participants will receive feedback from peers in the form of comments. Examples of feedback are provided in the survey (Appendix A). The same as for the firm feedback, these comments are based on examples from Chan et al. (2021). A manipulation check checked whether participants recognize peer feedback by asking them a question after they had read the scenario. As stated earlier, this manipulation check is discussed in section 3.4.3.

3.5.3 Continuance intention

The dependent variable that will be researched in the study is continuance intention. In the present study, continuance intention is defined as the willingness of a solver to continue participating in future contests organized by the company. As explained in chapter 2.4, this definition is based on previous studies on continuous or sustained participation intention (Sun et al., 2012; Wang et al., 2020; Wu & Gong, 2021). In the present study, the aim of the dependent variable is to measure to what extent participants of ideation contests intend to participate in the future. To measure this dependent variable, a scale was constructed with five items used in several previous studies. The first two questions are from Wang et al. (2020), 'I intend to continue participating in ideation contest of the firm 'De Meubelwinkel' and 'My intentions are to continue participating in ideation contest of the firm 'De Meubelwinkel' rather than in the ideation contest of other firms'. The third question is 'I plan to participate in the ideation contests of 'De Meubelwinkel' in the future (Jiang & Wagner, 2014). The fourth question is 'I will participate in the ideation contests of 'De Meubelwinkel' on a regular basis in the future' (Roca et al., 2006). The last question is 'I intend to continue participating in the ideation contests of 'De Meubelwinkel' rather than discontinue the participation (Jiang & Wagner, 2014). A composite mean score was created of these 5 items as a final score of 'continuance intention' for every participant.

3.6 Pre-test

Before sending out the survey, it was pre-tested three times. This pre-test was conducted to guarantee the reliability and validity of the survey and to check whether participants understood the survey and the manipulation of the scenarios. The first time it was sent to seven people for general feedback. These persons indicated that the scenarios were realistic and to the point. In order to validate whether the manipulation of the scenarios was clear to the participants, the manipulation check was pre-tested. It was distributed to six participants to control the clarity of the scenario and for the collection of general feedback on the survey. Regarding the questions of the manipulation check, six out of the six participants in the pre-test answered 'neutral', 'agree', or 'strongly agree' on all three questions. These results indicated that the manipulation and scenario were realistic and understandable. After the general feedback on the survey during the pre-test, some minor changes were made regarding grammar and the use of different vocabulary. As a result, the survey was pre-tested once more with three persons after these changes were made. All three persons scored 'neutral' or higher, which indicated the manipulation was still successful, resulting in the survey being published.

3.6 Data analysis procedure

The data for this study was obtained by means of a survey that was created in Qualtrics. Data that had been obtained underwent statistical treatment with the help of the statistical program SPSS. To check whether the participants recognized the type of feedback that was provided in the text fragment, a manipulation check was conducted as explained above. Moreover, the independent variable continuance intention made use of a scale as explained in chapter 3.5.3. This scale was tested with Cronbach's Alpha test of reliability to confirm the items in the scale together form a reliable scale.

Furthermore, in line with Hair et al. (2018), multiple analyses of variances (ANOVA) were used to measure the effect of firm feedback, peer feedback, and the interaction effect on continuance intention in ideation contests. It was analyzed whether the manipulation of the scenarios for the different groups had a causal effect on continuance intention and whether these effects differ between different groups. In other words, did the use of firm feedback, the use of peer feedback, and the interaction between both feedback types have significant effects on continuance intention?

3.7 Reliability and validity

In order to be able to guarantee reliability, Cronbach's Alpha was used to check the inter-item reliability of the scale used to measure the dependent variable continuance intention. The outcome of Cronbach's Alpha could range from 0 -1. In order to have a good reliable scale, the outcome of Cronbach's Alpha has to have a value of at least .70 (Hair et al., 2018).

A Cronbach's Alpha was conducted on the continuance intention scale and was found to be reliable. The scale consisted of 5 items with a Cronbach's Alpha of .852 ($\alpha=.85$), which is considered a good reliability. Furthermore, the reliability will not improve when deleting one or more constructs. Results of Cronbach's Alpha are displayed in table 1.

Table 1. Cronbach's Alpha

Construct	If item deleted
Continuance intention 1	.842
Continuance intention 2	.837
Continuance intention 3	.781
Continuance intention 4	.835
Continuance intention 5	.810

Regarding the validity, since the survey will be completely in Dutch, this will need to be translated from English into Dutch. In order to respect the validity of the survey, a language translation test will be done in which the English survey will be translated to Dutch, and then translated by a Dutch person back into English. Moreover, regarding the validity of the dependent variable, existing scales from previous studies were used that measured continuance intention as explained in chapter 3.5.3.

3.8 Limitations and Ethics

In this study, it would be unmanageable to avoid certain limitations. One limitation of the proposed study is that it will make use of a hypothetical ideation contest. This allows measures of continuance intention rather than real continuance. Furthermore, the study will be unable to conclude that continuance intention will lead to actual continuous participation in real-life ideation contests. Moreover, the proposed study will be carried out in the Netherlands among Dutch participants. This will only allow the study to make conclusions based on a Dutch sample and could differ from possible outcomes in other countries.

Concerning ethics, it is of great importance to take ethics into consideration. Participants need to give their consent before being able to participate in the experiment to guarantee that no forced participation will occur. Moreover, participation was completely anonymous, and participants were informed that they were able to step out of the experiment at any time without consequences. In the survey, participants were provided with information about the purpose of this study, as well as the institute at which this study is carried out, which is the Radboud University in Nijmegen. The obtained data were used exclusively for academic purposes and will not be shared with third parties. Moreover, an email address was provided to which participants could send a mail in case they would like to comment on something or if they have any questions about participation or other related questions. Participants were asked to leave their own email addresses in case they would like to know about the results of the survey and the study.

4. Results

In this section, the results of the data analysis are presented. The hypotheses that are stated in the theory are tested with the help of a factorial analysis of variance (N-way ANOVA). A two-way analysis of variance was conducted (Two-way ANOVA), from which the results are presented. Finally, additional analyses were conducted to investigate further findings.

4.1 Hypothesis testing and missing value analysis

In order to test the hypotheses that are created in chapter two, statistical tests need to be conducted. The testing of the three hypotheses was done by means of analyses of variance. Before conducting this ANOVA, a missing value analysis was conducted. It was found that there was no missing value except for the values of different scenarios since a participant had only been exposed to one scenario.

4.3.1 Two-way Analysis of Variance (Two-way ANOVA)

The selection for an analysis of variance (ANOVA) was made since the three hypotheses assume a relationship between the two independent variables, firm feedback, peer feedback, and their interaction on continuance intention. The presence of a control variable, 'prior experience' was also considered and threatened as a factor since it is a categorical control variable. Moreover, it should be checked for outliers, a unique combination of characteristics identifiable as distinctly different (Hair et al., 2018). Using a boxplot on the composite score of continuance intention (Appendix C), it was found that respondent 93 was perceived as an outlier and therefore should be taken into consideration in further analysis.

To conduct a two-way analysis of variance (two-way ANOVA), assumptions need to be checked whether an ANOVA can be conducted. Based on Hair et al. (2018) and Field (2013) these assumptions are: homogeneity of variance, normality of sampling distribution means, a sample size of at least 30, independence of scores, and independence of errors

To check whether the results of 'continuance intention' were normally distributed, skewness and kurtosis of the variable 'Continuance intention' were analyzed. The skewness was -.157, and kurtosis was -.753 which were in the critical zone of -2/+2 (Hair, 2018), therefore normality could be assumed. Furthermore, a Shapiro-Wilk test was conducted with the results provided in Table 2. Normality of the control group ($p = .005$) and the 'both group' ($p = .007$) can be assumed. For the firm feedback ($p = .351$) and the peer feedback ($p = .115$) groups, normality cannot be assumed. However, since the group sizes are larger than 30,

normality could still be assumed with regard to the central limit theorem. Additionally, this allows for the acceptance of the assumption regarding a sample size of at least 30.

Table 2. *Shapiro-Wilk test of normality.*

Group	N	Statistic	p-value
Control group	44	.92	.005
Firm feedback	39	.97	.351
Peer feedback	37	.95	.115
Both	45	.93	.007

The independence of scores assumption has been met, since the groups were randomly assigned in the experiment (Hair et al., 2018). Furthermore, to check the independence of errors, a scatterplot was created in which it was seen that the error terms are normally distributed, as well as uncorrelated (Appendix C). Therefore, the assumption of independence of errors was met.

To check the assumption of homogeneity of variance, the Levene's test was conducted. The result of Levene's test was $F(7,157) = 2.081, p = .049$. Since Levene's test had a significant result, the groups differ and the assumption of homogeneity of variance was violated.

Violation of this assumption could result in falsely rejecting null hypotheses. However, since ANOVA is quite robust and Levene's test is very sensitive, the presence of equal sample sizes could still allow for interpretation of the F statistic in case the sample sizes are equal, < 1.5 times as large as the other groups (Field, 2013). In this study, group sample sizes are not larger than 1.5 times the other groups. Therefore, results can still be interpreted.

All assumptions regarding the two-way ANOVA with prior experience as control variable are met. Therefore, a two-way analysis of variance (two-way ANOVA) was run to test the three stated hypotheses. The control variable 'prior experience' was not significantly related to continuance intention, $F(1,159) = 1.763, p = .186$. Moreover, there was no significant interaction effect of firm feedback and peer feedback, $F(1,160) = 3.048, p = .083$. The effect of firm feedback ($F(1,160) = .860, p = .355$) and the effect of peer feedback ($F(1,160) = 2.469, p = .118$) are not significant as well. Because prior experience has no significant effect on the dependent variable 'continuance intention', it was decided to leave this control variable out of the analysis.

Table 3. *Two-way ANOVA with control variable prior experience.*

	F statistic	P-value	Partial Eta Squared
Corrected model	2.264	.065	.054
Prior experience	1.763	.186	.011
Firm feedback	.860	.355	.005
Peer feedback	2.469	.118	.015
Firm feedback *	3.048	.083	.019
Peer feedback			

R Squared = .054 (Adjusted R Squared = .030)

Since the control variable ‘prior experience’ was not demonstrated to have a significant effect on continuance intention in the analysis. It was decided to run the analysis again without the presence of this covariate. Therefore, another two-way analysis of variance was conducted as elaborated in the next sub-section.

4.3.2 Two-way analysis of variance (Two-way ANOVA) without prior experience

To conduct another two-way ANOVA, the same assumptions have to be tested according to the procedure described in chapter 4.3.1. For normality, the Shapiro-Wilk test, as well as skewness and kurtosis did not change. Therefore, this assumption was met. Group sizes were not changed and still larger than 30. The assumption of independence of scores was also met through the random assignment of groups. Moreover, the independence of errors assumption was also met (Appendix C). Regarding the last assumption, homogeneity of variance, Levene’s test showed no significant result, $F(3,161) = 2.630, p = .052$. Therefore, homogeneity is assumed, and the last assumption is met,

Since all assumptions are met, a two-way ANOVA was conducted with firm feedback and peer feedback as independent variables, and continuance intention as the dependent variable. There was no significant main effect of firm feedback on continuance intention, $F(1,161) = .776, p = .380$. There was also no significant main effect of peer feedback on continuance intention, $F(1,161) = 2.999, p = .085$. Moreover, the interaction between firm feedback and peer feedback did also not show a significant effect on continuance intention, $F(1,161) = 3.310, p = .071$. All p-values are presented in Table 4.

Table 4. *Two-way ANOVA without control variable prior experience.*

	F statistic	P-value	Partial Eta Squared
Corrected model	2.420	.068	.043
Firm feedback	.776	.380	.005
Peer feedback	2.999	.085	.018
Firm feedback *	3.310	.071	.020
Peer feedback			

R Squared = .043 (Adjusted R Squared = .025)

4.3.3 Two-way analysis of variance (Two-way ANOVA) without prior experience and outlier

Since an outlier in the data could possibly affect the results of an analysis of variance. It was checked whether the outcome of the two-way ANOVA was different when the outlier was excluded from the analysis. The outlier, response 93 (Appendix C), was excluded from the analysis.

To conduct the two-way ANOVA, the equal list of assumptions has to be met according to the procedure that was followed in the ANOVAs that were conducted in chapters 4.3.1 and 4.3.2. Regarding the assumption of normality, skewness (-.162) and kurtosis (-.731) were analyzed which were in the critical zone of -2/+2. Moreover, a Shapiro-Wilk test was conducted (table 5) in which only the p-value for peer feedback changed ($p = .107$) with respect to the first ANOVA since the outlier that was removed was in the peer feedback group. The p-value indicates that normality cannot be assumed. However, the group was still larger than 30 which allows for accepting the assumption of normality.

Table 5. *Shapiro-Wilk test of normality.*

Group	N	Statistic	p-value
Control group	44	.92	.005
Firm feedback	39	.97	.351
Peer feedback	37	.95	.115
Both	45	.93	.007

The assumption of independence of scores was met since the participants were randomly assigned to different groups. The assumption regarding the independence of error was met (Appendix C). The homogeneity of variance assumption was violated since Levene's test was

significant, $F(3,163) = 3.254, p = .023$. However, like in the first ANOVA, equal sample sizes allow for the interpretation of the F statistic and therefore the ANOVA could be conducted.

There was a non-significant main effect of firm feedback on continuance intention, $F(1,160) = .509, p = .477$. Furthermore, there was a non-significant main effect of peer feedback on continuance intention, $F(1,60) = 3.657, p = .058$. However, this effect is only 0.008 away from being significant. Therefore, it could be assumed as a ‘marginally significant effect’. The effect strength was 2.2 % ($\eta^2 = .022$). Although only marginally significant, it is demonstrated that peer feedback has a small effect on continuance intention, whereas firm feedback clearly has no significant effect at all.

Furthermore, there was a significant interaction effect between firm feedback and peer feedback on continuance intention, $F(1,160) = 4.001, p = .047, \eta^2 = .024$. This indicates a small effect of 2.4%. To specify, the interaction effect demonstrated that when firm feedback is absent, giving peer feedback results in a higher continuance intention ($M=3.28, SD=0.54$) than not giving peer feedback ($M=2.83, SD=0.79$). However, when firm feedback is present, giving peer feedback ($M=3.13, SD=0.82$) does not result in a different outcome of continuance intention than not giving peer feedback ($M=3.14, SD=0.76$). Figure 2 shows this effect visually. Means, standard deviations, and p-values are presented in the tables below (Table 6 and Table 7).

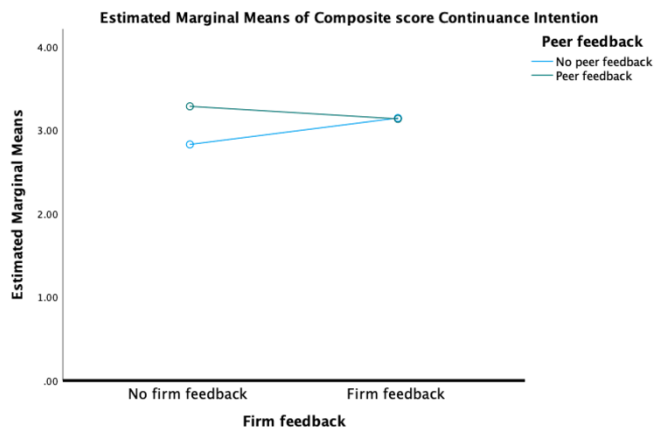
Table 6. *Two-way ANOVA without control variable prior experience and outliers.*

	F statistic	P-value	Partial Eta Squared
Corrected model	2.762	.044	.049
Firm feedback	.509	.477	.003
Peer feedback	3.657	.058	.022
Firm feedback *	4.001	.047	.024
Peer feedback			

R Squared = .049 (Adjusted R Squared = .031)

Table 7. Two-way ANOVA interaction effect means and standard deviations.

		Mean	SD	N	P-value
No firm feedback	No peer feedback	2.83	0.79	44	.007
	Peer feedback	3.28	0.54	36	.007
Firm feedback	No peer feedback	3.14	0.76	39	.950
	Peer feedback	3.13	0.82	45	.950



*Figure 2: Graph I of interaction effect firm feedback * peer feedback*

4.2 Additional analyses

After the two-way ANOVA was conducted and an interaction effect was found, additional analyses of variances were conducted to gather more information about possible effects of the demographic variables ‘Gender’, ‘Age’, and ‘Education’. However, the assumptions for ANOVA were violated regarding ‘Age’ and ‘Education’. Therefore, an n-way ANOVA was conducted with ‘Gender’ solely. ‘Gender’ was put in the model as a third predictor variable. The assumptions were all met (normality assumed, the sample size was bigger than 30, independence of scores, independence of errors, homogeneity of variance). The result of the N-way ANOVA regarding ‘Gender’ was not significant, $F(2,158) = .165, p = .848$. Therefore, gender was not found to have an effect on continuance intention.

5. Discussion

5.1 Hypotheses summarized

In chapter two, three hypotheses were derived from the theoretical background. Hypothesis one was rejected. The null hypothesis that firm feedback had no significant effect on continuance intention could not be rejected. Hypothesis two was marginally accepted. The null hypothesis that peer feedback had no significant effect on continuance intention could be marginally rejected. Hypothesis three was rejected. There was a significant interaction effect between firm feedback and peer feedback. However, this interaction did not result in a higher continuance intention when both types were present.

Hypothesis	Accepted / Rejected
<i>Hypothesis 1</i>	Rejected.
<i>Hypothesis 2</i>	Marginally accepted.
<i>Hypothesis 3</i>	Rejected.

5.2 Conclusion and discussion

This study was done with the aim to gain insights into the use of firm feedback and peer feedback in ideation contests. The research question stated in the introduction of this study was ‘*To what extent do firm feedback, peer feedback, and these factors together influence continuance intention in future ideation contests*’. This research question was studied with the help of the three stated hypotheses, listed above.

5.2.1 Hypotheses 1 and 2

Hypothesis one assumed there was a positive main effect of firm feedback on continuance intention in ideation contests. This hypothesis was based on several previous studies that discovered that firm feedback increases willingness to participate. For instance, by providing the participant with more clarity (Jiang & Wang, 2020), and increasing participants’ extrinsic motivation to compete in an ideation contest (Wu & Gong, 2021). However, in the present study, firm feedback did not have a main effect on continuance intention. It could be argued that the contest is hypothetical, and participants do not really receive feedback on their own ideas. Participants will not be able to adjust their own ideas and take personal learning out of it. Leimeister et al. (2014) discovered that participants take part in ideation contests to

experience a learning opportunity with the help of firm feedback. In the present study, it could be argued that this learning opportunity is absent since feedback is not given to the personal ideas of participants. Moreover, the examples of feedback that were given contained positive, as well as negative tones. Hofstetter et al. (2018) stated that negative feedback could decrease an individual's perception of competence, whereas positive feedback works the other way around. By providing both examples in the present study, the effect on continuance intention could be canceled out.

Hypothesis two assumed there was a positive main effect of peer feedback on continuance intention in ideation contests. The hypothesis was based on the paper of Wang et al. (2020), which discovered that peer feedback positively affects continuance intention due to peer interactivity. The significant effect of peer feedback on continuance intention, whereas firm feedback did not demonstrate a significant effect, could be explained by the structure of the sample. Since the sample in the present study contained a majority in the age group 18-25 it might be that younger people are more interested in receiving peer feedback instead of firm feedback. This could be caused by the fact that these people belong to Generation 'Z', which prefers networks rather than hierarchy (Arar et al., 2015). Therefore, this generation could perceive firm feedback as less important than peer feedback. Peer feedback could be perceived as more important because Generation 'Z' values the opinion of peers and people in their social group. However, future research should be done to explore this field in more depth.

The present study was conducted solely among Dutch participants. This could have possibly affected the outcome of the study. Previous studies that have been conducted regarding firm feedback or peer feedback in ideation contests or crowdsourcing platforms were mostly conducted in China (Jian & Wang, 2020; Wang et al., 2020; Wu & Gong, 2021). The cultural difference between China and the Netherlands could have affected the influence of firm feedback and peer feedback on continuance intention in ideation contests. China is known for its high power distance (Hofstede, 1980). In a society with high power distance, it is accepted that power is not equally distributed. In the Netherlands, the power distance is low. Low power distance could possibly explain why participants in ideation contests are not positively affected by firm feedback. It could be seen as more hierarchical than peer feedback since the firm could be seen as higher in power than the participant. Therefore, it could be that participants in the Netherlands are resistant to firm feedback which could affect their continuance intention in future ideation contests. Whereas, in China, participants are less

resistant to receiving firm feedback since the power distance is high and people could be more open to receiving more hierarchical and formal feedback from a firm.

5.2.2 Hypothesis 3

The third hypothesis assumed there was a positive interaction effect of firm feedback and peer feedback on continuance intention in ideation contests. This hypothesis was rejected since firm feedback and peer feedback together did not have a positive effect on continuance intention. However, a significant interaction effect was found between firm feedback and peer feedback on continuance intention in ideation contests. When firm feedback is absent, giving peer feedback results in higher continuance intention than not giving peer feedback. When firm feedback is present, there is no difference in continuance intention regardless of whether peer feedback is given or not. These findings imply that, in order to reach the highest continuance intention, peer feedback should be present and firm feedback should be absent. The main effect of peer feedback on continuance intention was considered marginally significant, it was only a fraction away from being significant ($p = .058$), whereas firm feedback was clearly not significant. This could explain a part of the interaction effect in which peer feedback was found to be the driving factor of the effect. This is in line with the findings of Chan et al. (2021), in which it was found that peer feedback is important when dealing with social status products. However, it did not affect continuance intention when firm feedback was present.

Interestingly, receiving more types of feedback will not result in a higher continuance intention than only receiving one type of feedback. It could be argued that participants of contests might not want to receive too much feedback from different sources. Koh (2018) discovered that the source of the feedback is important, and that peer feedback is perceived differently than firm feedback. Since both types of feedback are perceived differently by participants, they might generate confusion about the contest which could negatively affect continuance participation.

In summary, an answer to the research question could be formulated. Firm feedback does not significantly affect continuance intention in future ideation contests. Peer feedback was found to be marginally significant and has an influence on continuance intention in ideation contests. The interaction between both factors has an effect on continuance intention as well. This indicates that the effect of one type of feedback on continuance intention depends on the presence or absence of the other. To receive the highest continuance intention in future ideation contests, companies should not provide participants with firm feedback, but

with the opportunity to receive peer feedback instead. This could possibly save companies time and effort and will result in the highest probability of participants joining future ideation contests hosted by the company.

5.3 Theoretical implications

The present study has extended the research done in the field of ideation contests. From the existing theory, it was derived that receiving feedback on ideas in ideation contests could affect the participation and continuance intention of participants. In previous studies (Jung et al., 2020; Jiang & Wang, 2020; Wang et al., 2020; Deichmann et al., 2021) the effects of firm feedback and peer feedback had been investigated frequently. However, an empirical study investigating these two factors together was lacking. The present study analyzed both feedback types in the same design and studied their combined effect as well. Interestingly, the two types of feedback were found to interact significantly. These findings add to the relevance of the present study since the two types of feedback had not been investigated together but demonstrated that their interaction effect on continuance intention in future ideation contests is significant.

This study also discovered that the role of prior experience in ideation contests did not influence the outcome of continuance intention. This is contrasting with the findings of Zare et al. (2019) in which prior experience in ideation contests did influence the outcome of willingness to co-create. Therefore, it was expected that this would also influence continuance intention.

5.4 Practical Implications and Recommendations

The present study offers some practical implications as well, which companies in the furniture industry could use to make ideation contests more successful by enhancing continuous participation with the help of providing feedback. The participation in future ideation contests of a firm could contribute to more innovation in this competitive industry.

First, it demonstrated an interaction effect of firm feedback and peer feedback. This implies that a company designing an ideation contest should take both forms into account. It was discovered that to have the highest continuance intention, firm feedback should be absent and peer feedback should be present. Since Hofstetter et al. (2018) argue that giving firm feedback is costly, and the findings of the present study demonstrate that giving firm feedback

does not increase continuance intention when peer feedback is present, it could be not worth the investment to provide participants with firm feedback but provide peer feedback solely.

Second, it could be that a firm decides to provide its participants with firm feedback, which could be done for instance to make sure participants are on the right track. But when continuance intention in future ideation contests is the goal, the firm should not put time and monetary assets into creating a forum for peer feedback since peer feedback together with firm feedback does not significantly affect continuous intention.

Lastly, when the objective of giving feedback is increasing continuance intention, the firm should not necessarily focus on participants that already have experience in ideation contests. Prior experience was not found to influence continuance intention. However, it might be possible that participants with prior experience are to a greater extent able to come up with valuable ideas, but this study is not able to answer this question.

In summary, ideation contests could be a valuable tool for creating a competitive advantage through innovation. In order to be a valuable tool for a firm now and in the future, continuance intention in future ideation contests needs to be as high as possible. By creating a forum on which participants in this contest receive feedback from other participants and not providing these participants with firm feedback, continuance intention in future ideation contests will be the highest. Moreover, it was found that peer feedback has a marginally significant effect on continuance intention, whereas firm feedback has no effect. This supports the implication that providing participants with peer feedback and not with firm feedback is the most successful strategy for increasing continuance intention in future ideation contests in the furniture industry.

5.5 Limitations and Reflection

First, the present study consisted of a survey about a hypothetical ideation contest. Participants had to imagine they participated in a contest and received feedback or not. This is different from most previous studies, in which an ideation platform was analyzed where real contests took place. As discussed in the discussion section, differences between a real ideation contest and a hypothetical one could influence the outcome of continuance intention.

Second, the present study did not make a distinction between positive and negative feedback. In the study, participants were shown an example of both negative and positive types of feedback. However, the valence of feedback could have affected continuance intention according to the findings of Chan et al. (2015). Presenting participants with only positive, or only negative feedback, could have influenced the results of the present study.

Third, the study did not take the prize for the winning idea into account. It was mentioned that the participant with the best idea received a prize. However, it was not specified what this prize was. Hofstetter et al. (2018) discovered that participants are likely to drop out of a contest when not receiving a prize for it. It could be argued that not mentioning what the prize will include, might also result in dropping out of the contest since participants might not feel satisfied with the prize.

Fourth, the non-probability sampling method resulted in the age group 18-25 (Generation Z) being larger than the others. This could have affected the outcome of this study as explained in chapter 5.2.1 However, it could also explain certain findings as Generation Z is, as explained previously, more responsive to peer feedback than to firm feedback.

Fifth, the present study included a fictive brand name, 'De Meubelwinkel', to reduce the brand biases of participants. However, this name could also generate unconscious feelings about the brand and about the contest which could influence the results. However, the choice was made to provide participants with a brand name in order to create a more realistic scenario. The goal of creating a realistic scenario outweighed the possible brand associations and biases that participants could have with 'De Meubelwinkel'.

Lastly, the present study has taken place solely in The Netherlands with participants that were native Dutch. This could have affected the study since The Netherlands is known for being a multicultural country. Citizens with many different backgrounds other than natively Dutch live in the country. The present study only focused on native Dutch people, whereas in fact, the many different cultures that are present in The Netherlands could have affected the outcome of the study. Focusing on a broader sample than only native Dutch could have created a more realistic representation of the population. Furthermore, generalizability to other countries could not be assumed since the Netherlands has different cultural characteristics that could influence this study in comparison to other countries across the world.

5.6 Future research

In this section, possible future research directions are provided that could be insightful. These future directions also consider the limitations of the present study and try to avoid these. First, both types of feedback should be investigated in a real contest instead of in a hypothetical one. The present study contained a hypothetical contest by means of a survey, as discussed in chapter 5.4. Studying firm feedback and peer feedback together in a real ideation

contest could provide insights about firm feedback and peer feedback together in a real-world example which could enhance a more practical understanding of the working of feedback types in ideation contests.

Moreover, it would be interesting to extend the present study by investigating the effect of the valence of firm feedback and peer feedback on continuance intention. Previous research by Chan et al. (2015) has shown that the valence of feedback could affect idea generation. It might be interesting to study the differences between positive and negative firm feedback and peer feedback on continuance intention since it could give more guidelines to companies regarding their way of providing feedback.

Furthermore, this study was done with a furniture company as an example. The results could be different when extending this research to other industries. For future research, it could be interesting to investigate the effects of firm feedback and peer feedback on continuance intention in other industries like the food industry where companies such as Lay's already organized crowdsourcing contests in the past.

Lastly, feedback use in ideation contests is an interesting and frequently studied topic of research. A majority of the research done was located in China. However, the present study was done in The Netherlands. To extend this research, the topic could be studied in different cultures. For example, extending this research to other countries like East-European countries, or Scandinavian countries could discover new insights regarding differences between cultures. Especially for multinationals operating in different parts of Europe, Eastern European countries are much more collectivistic than Scandinavian countries (Hofstede, 1980), which might require a different approach regarding feedback in ideation contests to enhance higher continuance intention. This could be investigated in depth in future studies.

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Appendices

Appendix A: Survey/scenarios English

Introduction:

Dear participant,

We are Svenja, Jebid, Sara and Maks, four students of the master's degree programme 'Marketing' at Radboud University in Nijmegen. This survey was created as part of our master's thesis.

You are about to take part in this survey about an online ideation contest. This is a contest, organized by a firm, where consumers come up with ideas for new products that could be developed by the firm. Think of, for example, a new flavour for a product.

In the following section, information is given about the online ideation contest that is used in this survey. The online ideation contest is fictional and is organised by a fictional firm called 'De Meubelwinkel'. The online ideation contest takes place on the website of this firm. After this, you are asked to answer some questions. The survey will approximately take 5 minutes. We appreciate your time and participation in our survey.

Participation is completely voluntary and the results will be processed anonymously. You have the option to terminate your participation in the survey at any time, without consequences. In case you have any specific requests, questions or comments, you can send an email to 'an e-mail address'. Should you be interested in receiving the results of this survey, then you can leave your email address at the end of this survey. Your personal information will be treated confidentially.

You must be at least 18 years old to participate in the study.

- I understand the above, agree with the processing of my answers and I am older than 18 years
- I do NOT agree with the processing of my answers

Informative text:

In the next section of the survey, you are given a short piece of text that you must read. In this text, a scenario is outlined. Read the text carefully and try to immerse yourself in the scenario.

Control group:

Imagine the following situation for yourself.

You just participated in and completed an online ideation contest. The online ideation contest was organized by 'De Meubelwinkel' with the goal to design new furniture with the ideas of consumers. Prior to the online ideation contest you received the following description:

What are you missing in your home that is not in our store right now? Share your best ideas with us so we can help you create the products that you need in your home! 'De Meubelwinkel' is interested in designing new products, but for this, we need your help. Use your creativity and skills to come up with furniture that your home is still missing! At the end of the online contest, the participant with the best idea will receive a prize!

Please indicate the extent to which you agree with the following statement.

- The scenario feels realistic

Firm feedback:

Imagine the following situation for yourself.

You just participated in and completed an online ideation contest. The online ideation contest was organized by 'De Meubelwinkel' with the goal to design new furniture with the ideas of consumers. Prior to the online ideation contest you received the following description:

What are you missing in your home that is not in our store right now? Share your best ideas with us so we can help you create the products that you need in your home! 'De Meubelwinkel' is interested in designing new products, but for this, we need your help. Use your creativity and skills to come up with furniture that your home is still missing! At the end of the online contest, the participant with the best idea will receive a prize!

During the online ideation contest, you received feedback from 'De Meubelwinkel' in the form of comments on your idea. Examples of comments from the employees of 'De Meubelwinkel' are:

“Great idea! Our customers would love to have this product in their homes.”

or

“Unfortunately, it is impossible to produce this product with that material.”

Please indicate the extent to which you agree with the following statements.

- The scenario feels realistic
- I can imagine how the feedback is given in the online ideation contest
- I am aware that I have had feedback from 'De Meubelwinkel'

Peer feedback:

Imagine the following situation for yourself.

You just participated in and completed an online ideation contest. The online ideation contest was organized by 'De Meubelwinkel' with the goal to design new furniture with the ideas of consumers. Prior to the online ideation contest you received the following description:

What are you missing in your home that is not in our store right now? Share your best ideas with us so we can help you create the products that you need in your home! 'De Meubelwinkel' is interested in designing new products, but for this, we need your help. Use your creativity and skills to come up with furniture that your home is still missing! At the end of the online contest, the participant with the best idea will receive a prize!

During the online ideation contest, you received feedback from other participants of the online ideation contest in the form of comments on your idea. Examples of comments from other participants are:

“I really like this idea, I miss this in my house too!”

or

“I don’t like the design of the product, if I were you, I would change it.”

Please indicate the extent to which you agree with the following statements.

- The scenario feels realistic
- I can imagine how the feedback is given in the online ideation contest
- I am aware that I have had feedback from the other participants

Peer & Firm feedback:

Imagine the following situation for yourself.

You just participated in and completed an online ideation contest. The online ideation contest was organized by 'De Meubelwinkel' with the goal to design new furniture with the ideas of consumers. Prior to the online ideation contest you received the following description:

What are you missing in your home that is not in our store right now? Share your best ideas with us so we can help you create the products that you need in your home! 'De Meubelwinkel' is interested in designing new products, but for this, we need your help. Use your creativity and skills to come up with furniture that your home is still missing! At the end of the online contest, the participant with the best idea will receive a prize!

During the online ideation contest, you received feedback from 'De Meubelwinkel' and from other participants in the form of comments on your idea. Examples of comments from the employees of 'De Meubelwinkel' are:

“Great idea! Our customers would love to have this product in their homes.”

or

“Unfortunately, it is impossible to produce this product with that material.”

Examples of comments from other participants are:

“I really like this idea, I miss this in my house too!”

or

“I don’t like the design of the product, if I were you, I would change it.”

Please indicate the extent to which you agree with the following statements.

- The scenario feels realistic
- I can imagine how the feedback is given in the online ideation contest
- I am aware that I have had feedback from the other participants
- I am aware that I have had feedback from 'De Meubelwinkel'

Attention check:

Who organised the fictional online ideation contest of the scenario you just read?

- De Meubelwinkel
- The dentist
- The hairdresser
- The supermarket

Continuance intention:

In the following statements you are asked about your intention to participate in future online ideation contests of 'De Meubelwinkel' based on the scenario that you have read earlier.

Please indicate the extent to which you agree with the following statements.

- I intend to continue participating in the online ideation contests of 'De Meubelwinkel'
- My intentions are to continue participating in the online ideation contests of 'De Meubelwinkel' rather than the online ideation contests of other firms
- I plan to continue to participate in the online ideation contests of 'De Meubelwinkel' in the future
- I will participate in the online ideation contests of 'De Meubelwinkel' on a regular basis in the future
- I intend to continue participating in the online ideation contests of 'De Meubelwinkel' rather than discontinue the participation

Control variable:

Have you ever participated in an actual online ideation contest in the past?

For example, in contests where new ideas are collected regarding new flavours of a product or improvements of a product, or contests for designing a new logo, coming up with a new name, a new design of a product, or other contests where ideas are collected?

- Yes
- No

Demographics:

In the next section, you are asked to fill in some questions about your demographics.

What is your gender?

- Male
- Female
- Non-binary/third gender
- Prefer not to say

What is your age?

- 18-25 years
- 26-35 years
- 36-45 years
- 46-55 years
- 56-65 years
- 66-75 years
- 76 years and older

What is your nationality?

- Dutch
- Other

What is your highest completed education / are you currently pursuing?

- High school
- MBO
- HBO
- University
- Other
- Prefer not to say

Results:

If you would like to be informed about the results of this survey, you can leave your email address below. Your personal information will be treated confidentially.

Appendix B: Survey/scenarios Dutch

Q1 Intro

Beste participant,

Wij zijn Svenja, Jebid, Sara en Maks, vier studenten van de masteropleiding 'Marketing' aan de Radboud Universiteit in Nijmegen. Deze enquête is gecreëerd als onderdeel van onze master scriptie. U staat op het punt om mee te doen aan deze enquête over een online ideeënwedstrijd.

Dit is een wedstrijd, georganiseerd door een bedrijf, waar consumenten ideeën bedenken voor nieuwe producten die door het bedrijf ontwikkeld zouden kunnen worden. Denk hierbij bijvoorbeeld aan een nieuwe smaak voor een product.

In het volgende gedeelte wordt de informatie gegeven over de online ideeënwedstrijd die in deze enquête gebruikt wordt. De online ideeënwedstrijd is fictief en georganiseerd door een fictief bedrijf genaamd 'De Meubelwinkel'. De online ideeënwedstrijd vindt plaats op de website van dit bedrijf. Hierna wordt u gevraagd om enkele vragen te beantwoorden. De enquête zal ongeveer 5 minuten duren. We waarderen uw tijd en deelname aan onze enquête.

Deelname is volledig vrijwillig en de resultaten worden anoniem verwerkt. U heeft de mogelijkheid om op elk moment uw deelname aan de enquête zonder consequenties te beëindigen. Mocht u specifieke verzoeken, vragen of opmerkingen hebben kunt u een email sturen naar 'een e-mailadres'. Mocht u geïnteresseerd zijn in het ontvangen van de resultaten van deze enquête, kunt u uw mailadres achterlaten aan het einde van deze enquête. Er zal vertrouwelijk met uw persoonlijke informatie om worden gegaan.

Je moet ten minste 18 jaar oud zijn om met het onderzoek mee te doen.

In het volgende onderdeel van de enquête krijgt u een kort stukje tekst wat u moet lezen. In deze tekst wordt een scenario geschetst. Lees de tekst aandachtig en probeer u in te leven in het scenario.

Q2 Control group

Stel uzelf de volgende situatie voor. U heeft zojuist deelgenomen aan een online ideeënwedstrijd en u heeft deze voltooid. De online ideeënwedstrijd is georganiseerd door 'De Meubelwinkel' met als doel om nieuwe meubels te ontwerpen met de ideeën van consumenten. Voorafgaand aan de online ideeënwedstrijd heeft u de volgende omschrijving ontvangen:

Wat mis jij in jouw huis dat op dit moment nog niet in onze winkel ligt? Deel je beste ideeën met ons, zodat wij je kunnen helpen met het creëren van de producten die jij nodig hebt in jouw huis! 'De Meubelwinkel' is geïnteresseerd in het ontwerpen van nieuwe producten, maar hierbij hebben we jouw hulp nodig. Gebruik je creativiteit en vaardigheden om nieuwe meubels te bedenken die jouw huis nog mist! Aan het einde van de online wedstrijd zal de deelnemer met het beste idee een prijs ontvangen!

Geef aan in hoeverre u het eens bent met de volgende stelling
Het scenario voelt realistisch (helemaal oneens – helemaal eens)

Q3 Firm feedback

Stel uzelf de volgende situatie voor. U heeft zojuist deelgenomen aan een online ideeënwedstrijd en u heeft deze voltooid. De online ideeënwedstrijd is georganiseerd door ‘De Meubelwinkel’ met als doel om nieuwe meubels te ontwerpen met de ideeën van consumenten. Voorafgaand aan de online ideeënwedstrijd heeft u de volgende omschrijving ontvangen:

Wat mis jij in jouw huis dat op dit moment nog niet in onze winkel ligt? Deel je beste ideeën met ons, zodat wij je kunnen helpen met het creëren van de producten die jij nodig hebt in jouw huis! ‘De Meubelwinkel’ is geïnteresseerd in het ontwerpen van nieuwe producten, maar hierbij hebben we jouw hulp nodig. Gebruik je creativiteit en vaardigheden om nieuwe meubels te bedenken die jouw huis nog mist! Aan het einde van de online wedstrijd zal de deelnemer met het beste idee een prijs ontvangen!

Tijdens de wedstrijd heeft u feedback ontvangen van ‘De Meubelwinkel’ in de vorm van kritische opmerkingen op uw idee. Voorbeelden van opmerkingen van ‘De Meubelwinkel’ zijn:

“Goed idee! Onze klanten zouden dit product heel graag in hun huis willen.” Of “Helaas is het onmogelijk om dit product te produceren met dat materiaal.”

Geef aan in hoeverre u het eens bent met de volgende stellingen

Het scenario voelt realistisch

Ik kan me voorstellen hoe de feedback werkt in het scenario

Ik begrijp dat ik feedback heb gekregen van ‘De Meubelwinkel’

Q4 Peer feedback

Stel uzelf de volgende situatie voor. U heeft zojuist deelgenomen aan een online ideeënwedstrijd en u heeft deze voltooid. De online ideeënwedstrijd is georganiseerd door ‘De Meubelwinkel’ met als doel om nieuwe meubels te ontwerpen met de ideeën van consumenten. Voorafgaand aan de online ideeënwedstrijd heeft u de volgende omschrijving ontvangen:

Wat mis jij in jouw huis dat op dit moment nog niet in onze winkel ligt? Deel je beste ideeën met ons, zodat wij je kunnen helpen met het creëren van de producten die jij nodig hebt in jouw huis! ‘De Meubelwinkel’ is geïnteresseerd in het ontwerpen van nieuwe producten, maar hierbij hebben we jouw hulp nodig. Gebruik je creativiteit en vaardigheden om nieuwe meubels te bedenken die jouw huis nog mist! Aan het einde van de online wedstrijd zal de deelnemer met het beste idee een prijs ontvangen!

Tijdens de wedstrijd heeft u feedback ontvangen van andere deelnemers van de online ideeënwedstrijd in de vorm van kritische opmerkingen op uw idee. Voorbeelden van opmerkingen van andere deelnemers zijn:

“Ik vind het een heel goed idee, ik mis dit ook in mijn huis!” of “Ik vind het design van het product niet mooi, als ik jou was zou ik het veranderen.”

Geef aan in hoeverre u het eens bent met de volgende stellingen

Het scenario voelt realistisch

Ik kan me voorstellen hoe de feedback werkt in het scenario
Ik begrijp dat ik feedback heb gekregen van andere deelnemers

Q5 Firm en Peer feedback

Stel uzelf de volgende situatie voor. U heeft zojuist deelgenomen aan een online ideeënwedstrijd en u heeft deze voltooid. De online ideeënwedstrijd is georganiseerd door ‘De Meubelwinkel’ met als doel om nieuwe meubels te ontwerpen met de ideeën van consumenten. Voorafgaand aan de online ideeënwedstrijd heeft u de volgende omschrijving ontvangen:

Wat mis jij in jouw huis dat op dit moment nog niet in onze winkel ligt? Deel je beste ideeën met ons, zodat wij je kunnen helpen met het creëren van de producten die jij nodig hebt in jouw huis! ‘De Meubelwinkel’ is geïnteresseerd in het ontwerpen van nieuwe producten, maar hierbij hebben we jouw hulp nodig. Gebruik je creativiteit en vaardigheden om nieuwe meubels te bedenken die jouw huis nog mist! Aan het einde van de online wedstrijd zal de deelnemer met het beste idee een prijs ontvangen!

Tijdens de online ideeënwedstrijd heeft u feedback ontvangen van ‘De Meubelwinkel’ en van andere deelnemers in de vorm van kritische opmerkingen op uw idee. Voorbeelden van opmerkingen van ‘De Meubelwinkel’ zijn: “Goed idee!” Onze klanten zouden dit product heel graag in hun huis willen.” Of “Helaas is het onmogelijk om dit product te produceren met dat materiaal.” Voorbeelden van opmerkingen van andere deelnemers zijn: “Ik vind het een heel goed idee, ik mis dit ook in mijn huis!” of “Ik vind het design van het product niet mooi, als ik jou was zou ik het veranderen.”

Geef aan in hoeverre u het eens bent met de volgende stellingen
Het scenario voelt realistisch
Ik kan me voorstellen hoe de feedback werkt in het scenario
Ik begrijp dat ik feedback heb gekregen van andere deelnemers
Ik begrijp dat ik feedback heb gekregen van ‘De Meubelwinkel’

Q8 Attention Check

Wie heeft de fictieve online ideeënwedstrijd van het scenario dat u zojuist hebt gelezen georganiseerd?

- De Meubelwinkel
- De Tandarts
- De Kapper
- De Supermarkt

Q7 Continuance intention

In de volgende stellingen wordt u gevraagd naar uw intentie om deel te nemen aan toekomstige online ideeënwedstrijden van ‘De Meubelwinkel’ gebaseerd op het scenario dat u eerder heeft gelezen. Geef aan in hoeverre u het eens bent met de volgende stellingen.

- Ik heb de intentie om door te gaan met deelnemen aan de online ideeënwedstrijden van ‘De Meubelwinkel’.
- Mijn intenties zijn om door te gaan met mijn deelname aan de online ideeënwedstrijden van ‘De Meubelwinkel’, liever dan online ideeënwedstrijden van andere bedrijven.
- Ik ben van plan om door te gaan met mijn deelname aan de online ideeënwedstrijden van ‘De Meubelwinkel’ in de toekomst.

- Ik zal regelmatig deelnemen aan de online ideeënwedstrijden van ‘De Meubelwinkel’ in de toekomst.
- Ik heb de intentie om door te gaan met deelnemen aan de online ideeënwedstrijden van ‘De Meubelwinkel’ in plaats van mijn deelname te stoppen.

Q9 Past experience

Heeft u in het verleden ooit deelgenomen aan een echte online ideeënwedstrijd ?

Bijvoorbeeld in wedstrijden waarbij nieuwe ideeën werden verzameld met betrekking tot nieuwe smaken van een product of verbeteringen van een product, of wedstrijden voor het ontwerpen van een nieuw logo, het bedenken van een nieuwe naam, een nieuw ontwerp van een product, of andere wedstrijden waarbij ideeën werden verzameld?

- Ja
- Nee

Q11 Demographics

In het volgende gedeelte wordt u gevraagd om enkele vragen in te vullen over uw demografische gegevens.

Wat is uw gender?

- Man
- Vrouw
- Non-binair / derde gender
- Zeg ik liever niet

Q10

Wat is uw leeftijd?

- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- 66-75
- Ouder dan 75

Q12

Wat is uw nationaliteit?

- Nederlands
- Anders

Q13

Wat is uw hoogst genoten opleiding?

- Middelbare school
- MBO
- HBO
- Universiteit
- Anders

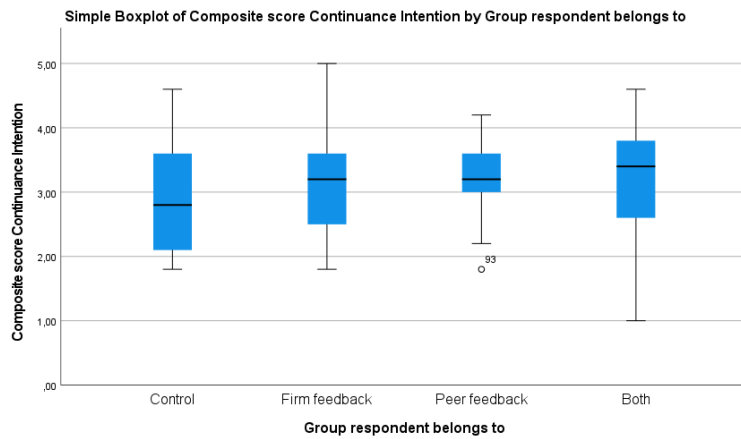
- Zeg ik liever niet

Q14

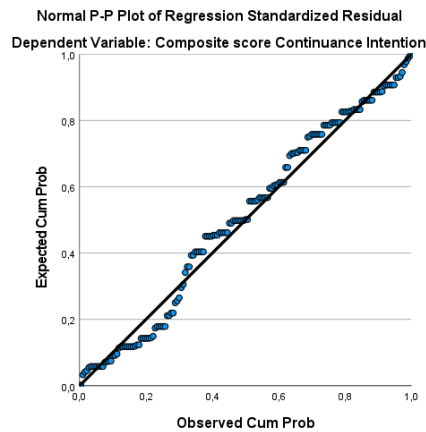
Als u graag geïnformeerd wilt worden over de resultaten van deze enquête kunt u uw e-mailadres hieronder achterlaten. Uw persoonlijke informatie zal vertrouwelijk worden behandeld.

Appendix C: Outliers and Assumptions ANOVA

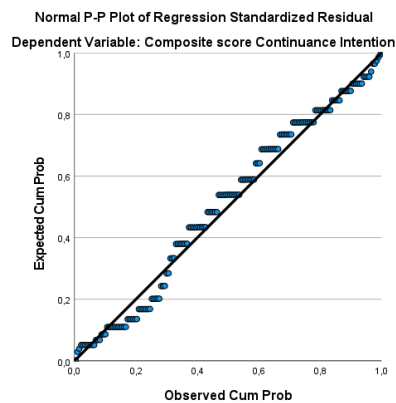
C1. Boxplot outliers



C2. Independence of errors with outlier and prior experience ANOVA



C3. Independence of errors without prior experience ANOVA



C4. Independence of errors without prior experience and outlier 93 ANOVA

