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Creativity and Task Perception*

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Abstract

This paper explores how individuals perceive open versus closed tasks in creative contexts and how this perception influences their choice between these tasks. We find that perceptions of task openness align with existing assumptions in the creativity literature regarding goal clarity and the freedom to explore. Additionally, we show that the likelihood of choosing an open task increases with the perceived freedom to explore, while it decreases with goal clarity, particularly when incentives are present. The effects of self-selection on creative performance are then investigated.

Keywords: creativity; openness; perception; constraints; self-selection.

JEL codes: C91; D91; 031.

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1 Introduction

Participation and performance in any task are significantly influenced by how tasks are perceived by individuals, since perception shapes motivation, engagement, and strategies employed to tackle challenges. Theoretical frameworks such as goal setting theory propose that the way objectives are presented, whether specific and challenging or vague and easy, affects employee performance and outcomes (e.g. Locke and Latham (1990)). Similarly, studies on intrinsic motivation, such as those of Deci et al. (1985), illustrate that tasks perceived as autonomous and aligned with personal interests enhance engagement and output compared to those seen as externally controlled. These examples underscore the multifaceted impact of task perception, emphasizing its importance in shaping human behavior and performance.

Exploring how task perception affects creative performance is pivotal in understanding human cognitive processes and decision-making in the complex phenomenon of creativity. One key dimension influencing creative engagement is related to the way a problem is classified in problem-finding research (Getzels and Csikszentmihalyi, 1967; Csikszentmihalyi and Getsels, 1970; Dillon, 1982) and to the type of cognitive operations required, as emerged in the seminal contribution of Guilford (1956) on divergent versus convergent thinking, and onward. An individual who deals with a creative task is engaged in a cognitive process. The classic distinction in the literature is between divergent thinking and convergent thinking (Guilford, 1956), where the former involves the generation of multiple ideas, while the latter results in a single logical solution. Consequently, tasks can be characterized by the type of thought process they generate. This differentiation between tasks can be expressed through their openness, which means the extent of constraints imposed on problem-solving.

In the general sense, constraints are perceived as limitations or barriers that "*decrease the number of options available by precluding some responses to a task*" (Tromp and Sternberg, 2024). Numerous formulations have been used over the years in the literature on creativity to designate constraints, including press (defined as the relationship between individuals and their environment) (Rhodes, 1961), requirements (Mednick, 1962), or criteria (Amabile, 1982). Although creativity is often seen as the ultimate expression of freedom, it is not possible for ideas to emerge without constraints. In fact, "*What makes a person or product creative is the flair of originality constrained by usefulness, and the benefit of usefulness constrained by originality*" (Kaufman and Sternberg, 2010). This attention paid to constraints is even more important as it shaped the way researchers classified creative tasks. Once we acknowledge that constraints are inherent to any creative process, there is no clear answer to whether constraints are strictly good or bad for creativity. Although some authors conclude on a general positive effect of constraints on creativity (Haught-Tromp, 2017), others warn about their negative consequences on creativity (Amabile and

Gryskiewicz, 1989). In their review, Acar et al. (2019) suggest the presence of an inverted U-shaped relationship between constraints and creativity, with the idea that constraints will contribute positively to creative performance once the "sweet spot" is reached, and too little or too big constraints are detrimental to it. However, this "*sweet spot will differ depending on the type of constraint, the person, the creative task, and the external situational circumstances*" (Tromp and Sternberg, 2024). Researchers often propose a continuum that varies from closed to open problems (Attanasi et al., 2021; Unsworth, 2001). This is reflected in creative tasks differing along the "openness" (or symmetrically, "closeness") dimension: in 'closed' tasks, ex ante goals are well specified, and strong constraints are imposed on subjects' responses. In a true closed problem, the method for solving the problem is known, as in the case of an equation. Closed tasks overlap with Galenson (2006)'s notion of experimental creativity, where subjects solve a problem following a tentative and incremental procedure. In the case of 'Open' tasks, no restrictions apply, and subjects are free to explore without boundaries, being required to find, invent or discover the problem itself, as in Galenson (2006)'s definition of conceptual creativity. However, researchers who frame their results around this dichotomy rarely, if ever, challenge the validity of this classification. Subjects' actual perception of the degree of openness or closeness of a task has never been explicitly investigated. However, it is plausible that the way subjects perceive a task greatly influences their creative approach, regardless of its *a priori* classification. This study investigates the perception of task openness in an experimental context to assess whether the presuppositions in the literature hold.

In addition to not questioning how different tasks are perceived, experiments on creativity typically present subjects with one or more predetermined tasks, with no possibility for the subject to choose between tasks of different types. Letting subjects choose can be interpreted as a form of revealed preference for the task, providing "costly" information on subject's perception on top of self-reported information. The literature in economics, psychology, and management consistently indicates that allowing individuals to choose the tasks they undertake can have profound effects on their performance, motivation, and satisfaction. In economics, self-selection models suggest that when individuals are given the autonomy to select tasks, they often choose those that align with their skills and preferences, leading to increased efficiency and productivity (Lazear, 2000). Psychology research supports this by demonstrating that task choice fosters a sense of autonomy, which is a core component of intrinsic motivation according to Self-Determination Theory (Deci and Ryan, 2002). This intrinsic motivation is related to increased persistence, engagement, and creative output. In the realm of management, the concept of job crafting highlights how employees proactively modify their tasks to better suit their strengths and interests, leading to improved job satisfaction and performance (Wrzesniewski and Dutton, 2001). Collectively, these findings emphasize that the opportunity to choose tasks empowers individuals, resulting in better

alignment with their capabilities and fostering a more motivated and effective approach to work. Although freedom to choose tasks can enhance motivation and alignment with personal skills, it also introduces elements of risk and uncertainty. In economics, risk-based decision making is a well-studied area, with individuals often showing varying risk preferences that influence their decisions since (Knight, 1921). When individuals select tasks, they may face uncertainty about their ability to successfully complete them or the potential rewards, leading to anxiety and decision paralysis, especially if the stakes are high. Furthermore, the choice in favor of a task can be the consequence of a biased self-evaluation (for instance due to the different information available, such as in Danz (2020)), leading to overentry in a competition and overplacement. In psychology, the concept of choice overload suggests that having too many options can be overwhelming, causing stress and reducing satisfaction with the decision (Schwartz, 2004). Management literature also highlights that, while task choice can lead to empowerment, it can simultaneously create a sense of accountability and pressure, since individuals are solely responsible for their success or failure (Eddy et al., 2013). These aspects of risk and uncertainty necessitate a careful consideration of how choice is structured and supported in organizational contexts, to ensure that the benefits of autonomy do not outweigh the potential downsides of indecision and performance anxiety. Thus, our second contribution consists of testing the effects of allowing subjects to choose between an open and a closed task. This choice is studied in relation to how the task is perceived in terms of clarity of goals, freedom to explore, ease, and confidence in its own absolute and relative performance.

Finally, this paper builds on the work of Charness and Grieco (2019) and the role of incentives in the creative process. We test whether the choice between the two tasks depends on the presence of incentives that reward creative performance within the task. In their work on creativity and incentives, Charness and Grieco (2019) have provided a hint to understand the mixed results (Collins and Amabile, 1999; Ariely et al., 2009; Laske and Schroeder, 2017; Neckermann et al., 2014; Erat and Gneezy, 2016) on the role of monetary incentives in promoting creativity, showing that paying performance can be effective in closed tasks, while, in contrast, directly incentivizing open creativity would be ineffective or even counterproductive. Monetary incentives are effective with closed tasks only, because incentives stimulate effort, but creative performance depends on effort in closed tasks only, where the goal is clearly specified. We test whether the preference for a task is affected by the incentive scheme (Incentives vs. Flat payment), since subjects might feel more comfortable in self-selecting in tasks where the constraints restrict the possible creative output and thus the uncertainty of evaluations. Or, viceversa, constraints might be perceived as a burden that limits their chances of success. Furthermore, confidence in own creative performance might mediate the effects of motivating variables such as monetary incentives (Bandura, 1997).

By analyzing how people perceive and engage with open versus closed tasks in creative

environments, this study aims to examine whether the perception of the degree of openness of tasks aligns with assumptions in the literature on creativity. This experimental protocol allows subjects to choose between open versus closed tasks, and investigates the reasons behind such choice, including the possible effect of different incentive schemes. This paper thus attempts to provide a deeper understanding of some of the key cognitive and motivational influences that drive creativity and innovation.

Our results show that individuals select tasks based on personal perceptions, and performance-based incentives amplify this tendency. Although self-selection does not guarantee higher absolute performance, closed tasks, compared to open tasks, lead to greater confidence in performance estimation. However, for top performers choosing the closed task, the increased competition level cancels out the benefits of choosing a task where they excel, and thus lowers the creative scores for the most creative individuals.

In the next section, we describe the hypotheses. Section 3 illustrates the experimental design. Section 4 presents information on the collected data and reports our findings. Section 5 concludes with a discussion of the implications of our study.

2 Hypotheses

We aim to test three main hypotheses.

First, we want to test whether subjects perceive the openness of the task as expected in the literature. Although in studies on creativity, the classifications of tasks considered closed versus open tend to be not questioned, subjects can differ in how they perceive the task. To the best of our knowledge, these aspects have never been explicitly examined so far. In fact, it is plausible that the way the subjects perceive a task greatly influences their creative approach, regardless of its prior classification. For example, a task judged to be open by researchers may be perceived as more closed by some subjects due to constraints that the experimenters did not add explicitly, or may arise from the way the goal is formulated. By neglecting this subjective dimension, studies might underestimate the diversity of creative responses and oversimplify the complexity of creative processes. Consequently, our first contribution aims to examine whether the perception of the degree of openness of different tasks aligns with assumptions in the creativity literature. To test whether this alignment occurs, subjects will answer two questions aimed at measuring how clear was the goal they had to reach on each task and how free to explore they felt completing each task.

Hypothesis 1: *In open creativity tasks, subjects perceive the goal to be less clearly defined and feel more free to explore.*

The second hypothesis we test is related to how the openness of the task can influence

the willingness of the subjects to engage in a specific task. Instead of just comparing subjects' creative performance in tasks differing in their degree of openness, as typical in the literature, we will also examine subjects' choice to complete one specific task. By deciding to engage in a closed vs. open task, subjects will reveal their preference for the type of task. subjects might choose a task only depending on the intrinsic benefit they expect when completing it, or because they feel more comfortable in self-selecting in tasks where the constraints restrict the possible creative output, or where constraints are less tight.

Hypothesis 2: *The degree of openness of a task affects the subject's preference for the task.*

As a third hypothesis, we test whether the choice between the two tasks depends on the presence of incentives that reward the creative performance in the task. Charness and Grieco (2019) have shown that monetary incentives are effective with closed tasks only. We test whether the preference for a task is affected by the incentive scheme (flat payment versus performance-based payment in the form of tournament), since being compensated depending on own relative performance may activate mechanisms that depend on the subject's risk or ambiguity attitude, or be related to the subject's level of confidence in own ability in completing a certain task. In this respect, people might prefer the task that is perceived easier (because of the presence of constraints, or because of the lack of constraints, depending on the subject's attitude). Furthermore, individuals may reason strategically, selecting the task they expect less people to choose, and thus "less competitive".

Hypothesis 3a: *Incentives increase self-selection in closed tasks.*
Hypothesis 3b: *Incentives increase self-selection in open tasks.*

3 The experiment

The experiment has a 2x2 between-subject design, where we give the possibility (or not) to choose between tasks, and vary the incentive scheme (flat payment vs. performance-based incentives), thus obtaining four conditions. Each subject is assigned to one of the four conditions only. The subject's creative performance is evaluated twice: (1) during the experiment by peer judges (i.e. subjects in the same experimental session belonging to another group), who ranked creative answers produced within groups of five subjects, and (2) by external judges — blind to treatments and conditions, who assign a score in the range 1 ("not creative at all") – 10 ("extremely creative") to six creative answers randomly drawn from a tank containing all creative answers in each task. Instructions and questionnaires for the in-lab creativity experiment, as well as instructions for creativity assessment, are available in

Appendix A and Appendix B, respectively.

3.1 Tasks

We follow Charness and Grieco (2019) in choosing the same closed creativity task - where subjects "combine" existing items within constraints - and the open creativity task where they are asked to develop a totally new product with no constraints.
The tasks reads as follows:

Closed task
"Choose a combination of words to create an interesting story." The words supplied are: *house, zero, forgive, curve, relevance, cow, tree, planet, ring, send.*. Subjects were told that they must use these words along with any other combination of words that they wished.

Open task
"If you had the talent to invent things just by thinking of them, what would you create?"

3.2 Treatments

In the experimental design, we manipulate two key features: subjects' payment (Flat Payment versus Incentives), and the possibility to choose between tasks (No Choice versus Choice).

- In the *No Choice* treatment, subjects had to complete both the creative tasks (Open and Closed), which were presented to them in randomized order.
- In the *Choice* treatment, subjects had to select only one of the two creative tasks, again presented in randomized order.
- In the *Flat Payment* treatment, subjects received a flat amount no matter their performance in the task(s).
- In the *Incentives* treatment, subjects were paid based on their performance in the creative task. In the No Choice condition, where they completed two tasks, one of them only was selected at random by the subject's computer and actually paid. The experimental instruction clearly specified that the two tasks had the same probability of being drawn and then paid. Subjects took part in a tournament, i.e. payment was based on the subject's position in a ranking made by five other subjects enrolled in the same experimental session, but belonging to a different group. Peers' ranking were averaged and determined subject's payment.

These two features (type of payment and possibility to choose) result in four conditions, which will be referred to as follows throughout this paper: *No Choice Flat Payment* (NCFP), *No Choice Incentives* (NCI), *Choice Flat Payment* (CFP), and *Choice Incentives* (CI).

Right after each task, subjects were asked to answer a set of questions aimed at capturing their perception of the task characteristics and their attitude towards the task. Firstly, they were asked to assess how much they liked the task, how clearly formulated was the goal to reach in the task, and how free they felt to explore in the task. Then, they were asked to self-evaluate their own performance in the task, and to self-assess their relative performance with respect to other subjects. All answers had to be given in a 1-10 scale. In the Choice treatment, subjects were asked to answer the two questions about task perception (about goal clarity and freedom to explore) also regarding the task they did not choose. Furthermore, they had to answer an open question asking to motivate why they selected one task instead of the other.

3.3 Questionnaires

In the questionnaire we presented at the end of the experiment, we requested demographic information and also asked subjects to answer two incentivized questions on risk and ambiguity attitude (Gneezy and Potters, 1997): each individual is endowed with 100 units (with each unit corresponding to 0.01 euro) and could invest any portion in a risky asset that had a 50% chance of success and paid 2.5 times the amount invested if successful and nothing if unsuccessful; the individual retains whatever units were not invested. This procedure provides a measure of risk aversion for each individual: the higher the investment, the less risk averse the individual is. The question on ambiguity attitude was identical except for the fact that subjects were not told the probability that the investment would be successful (which was 50% as in the risky asset).

The questionnaire also included questions on demographic features: gender, age, major, past involvement in creative activities, preference for creative endeavors. Since both tasks were verbal task, we asked whether subjects were native French speakers.

3.4 Creativity evaluations

As mentioned, in both the Flat Payment and in the Incentives treatments, subjects in one group evaluated and ranked the individual responses from people in another group: subjects received no specific criteria to follow but their own taste for creativity. To make comparisons across treatments, we recruited on Prolific Academics 400 external judges - blind to treatments — to evaluate on a 1–10 scale six answers drawn at random out all of the answers produced in the in-lab experiment. As with peer ranking, external raters received no indication of any specific criteria to be followed in assessing creativity.

3.5 Procedures

The experiments were conducted at the *LEES* at the University of Strasbourg (France) from the 25th to the 27th February 2025. There were eight sessions and a total number of 320 subjects. The 320 subjects were equally distributed across the four conditions (NCFP, NCI, CFP, and CI). Among the 160 subjects who underwent into the Choice treatment, 83 opted to pursue the Closed task (37 with Flat payment and 46 with Incentives), while 77 chose the Open task (43 with Flat payment and 34 with Incentives). The subjects were students recruited through the ORSEE platform, with 63.32% females and an average age of nearly 22 years. Instructions were presented to the subjects and read aloud by the experimenter. Subjects received an average payoff of 15.08 euros, including a 6 euros show-up fee, and sessions took on average one hour and a half. In the end, one observation was incomplete due to a technical issue and then dropped.

As of external judges recruited on Prolific, we ran two sessions (one for the Closed task, one for the Open task) between February 28, 2025 and March 4, 2025. The Prolific sample was pre-screened on the basis of French being the judge's first language. In the Open task session, 182 out of 200 subjects completed the experiment, with an average completion time of 5 minutes and 17 minutes. In the Open task session, 182 out of 200 subjects completed the experiment, with an average completion time of 5 minutes and 17 minutes. In the Closed task session, 197 out of 210 subjects completed the experiment, with an average completion time of 7 minutes and 17 minutes. The judges received a flat payment of about 3.60 euros. Their evaluations were collected through the administration of a Qualtrics survey via Prolific Academics.

4 Results

4.1 Tasks perception

Table 1 presents summary statistics and Wilcoxon signed-rank test results comparing *goal clarity* and *freedom to explore* as perceived by subjects between Open and Closed tasks. The results of our test for goal clarity (henceforth "clarity") indicate significantly lower scores in the Open condition, while the tests for freedom to explore (henceforth "freedom") suggest significantly higher perceived freedom in the Open task. We also controlled for differences in perception of clarity and freedom over each condition and found only a significant difference in freedom between the NCFP and CI conditions in the Open task ($p = 0.029$) showing that subjects facing both the presence of a performance-based payment and a choice to make (as in the CI condition) felt less free to explore than those with flat payment and no choice (diff $= -0.899$), probably because of the stronger pressure of both performing and choosing well

to get a higher payment. No other difference has been observed either for the Open or Closed task. These results provide support to *Hypothesis 1* as subjects perceive the goal to be less clearly defined but feel freer to explore in an open task, while it is the opposite for a closed task.

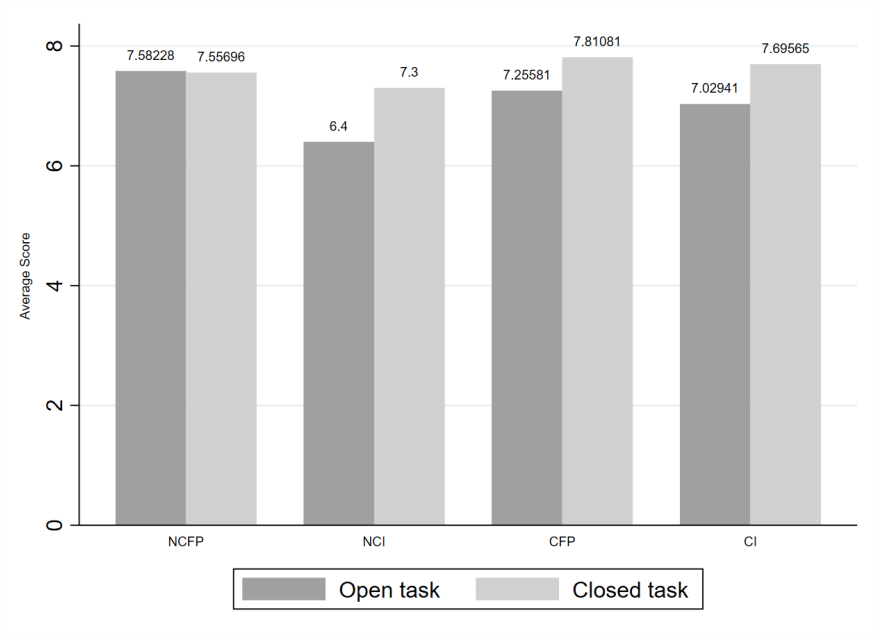
In addition to these considerations about clarity and freedom, we also compared how subjects enjoyed performing the Open and Closed tasks. The level of enjoyment was high for both tasks: 7.04 vs 7.54 in a range 1-10, with no significant differences between tasks ($z = -1.501$, $p = 0.1335$, Wilcoxon signed rank test). Once we control for the condition subjects were enrolled in, we only find a significant difference in how subjects enjoyed performing the Open task between the NCFP and NCI conditions (diff $= -1.182$, $p = 0.016$, Tukey's HSD test), suggesting that a performance-based payment may reduce the amusement of engaging in an Open task, in line with the literature showing a crowding out effect of the pleasure of being creative once incentives are in place (Amabile et al., 1986). All other comparisons led to non-significant differences. Figure 1 illustrates the difference in average enjoyment between conditions, comparing subjects' self-reported levels while performing the Open vs. Closed tasks.

Table 1: Goal Clarity and Freedom to Explore Between Open and Closed Tasks

Variable	Condition	Obs	Mean	Std. Dev.	Min	Max
Goal clarity	Open	319	8.20	2.07	1	10
	Closed	319	9.17	1.38	2	10
Freedom to explore	Open	319	8.38	2.05	1	10
	Closed	319	7.64	2.11	1	10

Test	z-statistic	p-value
Goal clarity (Open vs. Closed)	-7.973	0.0000
Freedom to explore (Open vs. Closed)	5.572	0.0000

Figure 1: Enjoyment of Task Completion Across Conditions



4.2 Task choice

To determine whether subjects had a general preference for the Open or Closed task when given the opportunity to choose between them, we conducted a binomial test. We observed a sample proportion slightly above 50% (77 subjects choosing the Open task and 83 choosing the Closed task), but this difference was not statistically significant ($p = 0.6928$, Binomial test). This result suggests that subjects did not have a strong preference for one task over the other, consistently with the level of average self-reported enjoyment that, as shown above, is similar across tasks. In addition, considering the relationship between subjects' task choice and the incentive scheme, the results show that we failed to reject the null hypothesis ($\chi^2(Open) = 2.0279$, $p = 0.154$). This means that there is no statistically significant association between our two variables: the distribution of choice (Open vs. Closed) does not differ significantly between the two incentive treatments (Incentives vs. Flat payment).

Table 2 confirms the previous finding and presents the results of a set of Probit regressions exploring the determinants of subjects' choice in favor of a specific task. The dependent variable is the probability of choosing the Open task over the Closed task, and the observations are limited to those in the Choice treatment. Consistently with previous results on task perception, we observe a positive effect on the choice in favor of the Open task of perceiving that task as providing more freedom to explore. On the contrary, the probability of *not* choosing the Open task (and, instead, choosing the Closed task) is higher when subjects perceive the goal of the task as clearer (see Column 1). This result supports *Hypothesis 2* stating that the degree of openness of a task affects subjects' preference for

the task. Incentives do not affect the choice *per se* (see Column 2), but interact with the perception of the task, reinforcing previous results (Column 3): when payment depends on performance, subjects appear to be more careful in weighting the relative advantage of each task, caring even more about freedom when choosing the Open task, and even more about clarity when choosing the Closed task. This result only partially supports *Hypothesis 3* on the role of incentives in subjects' self-selection in a task.

Table 2: Determinants of Choice: Probit regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Clarity	-0.301***	-0.301***	-0.182**	-0.290***	-0.287***	-0.208**	-0.135
	[0.067]	[0.068]	[0.080]	[0.070]	[0.070]	[0.084]	[0.088]
Freedom	0.217***	0.223***	0.041	0.243***	0.243***	0.026	0.080
	[0.068]	[0.069]	[0.090]	[0.074]	[0.074]	[0.099]	[0.136]
Incentive		-0.282	-1.464	-0.293	-0.320	-1.579	-1.436
		[0.211]	[1.405]	[0.213]	[0.222]	[1.425]	[1.377]
Inc_clarity			-0.386**			-0.398**	-0.706***
			[0.160]			[0.165]	[0.186]
Inc_freedom			0.526***			0.548***	0.821***
			[0.164]			[0.175]	[0.247]
Confidence				-0.006	-0.030		
				[0.051]	[0.074]		
Inc_confidence					0.044		
					[0.098]		
CONTROLS	NO	NO	NO	NO	NO	YES	YES
MHT	NO	NO	NO	NO	NO	NO	YES
Constant	0.708	0.792	1.304	0.509	0.496	1.829*	1.771
	[0.634]	[0.644]	[0.837]	[0.690]	[0.691]	[1.068]	[1.209]
Observations	160	160	160	156	156	160	156

*** p<0.01, ** p<0.05, * p<0.1

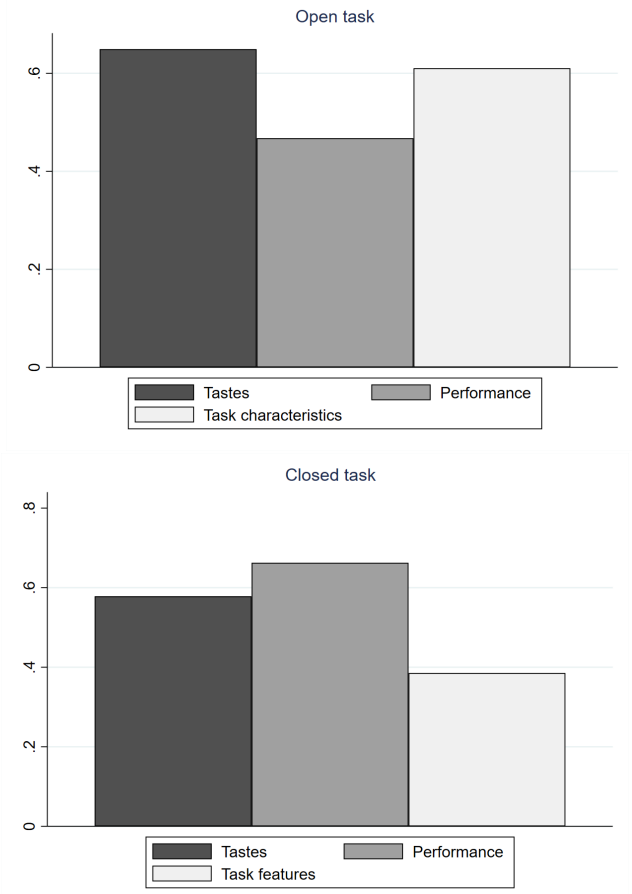
Notes: Probit (standard errors in parentheses). The dependent variable is a dummy variable assuming value equal to 1 when the subject chooses the Open task, and 0 when she chooses the Closed task. Clarity is a variable assuming values between 1 and 10 and increasing in the perceived clarity of the task goals. Freedom is a variable assuming values between 1 and 10 and increasing in the perceived freedom to explore that the task allows. Incentive is a dummy variable assuming value equal to 1 when payment is performance-based, and 0 in case of flat payment. Inc_clarity is the interacted variable between Clarity and Incentive. Inc_freedom is the interacted variable between Freedom and Incentive. Confidence is a variable obtained computing the difference between the subject's estimation of her score in the task in a range 1-10, and her actual average score assigned by the External Judges in a range 1-10. Inc_confidence is the interacted variable between Confidence and Incentive. Controls include: gender, age, native language, risk attitude, ambiguity attitude, task order, how frequently the subject is engaged in creative tasks in a 1-10 scale, how much the subject enjoyed the task in a 1-10 scale. Multiple Hypothesis Testing procedure has been run using the mhtexp procedure illustrated in (List et al., 2019). The rwolf command gives very similar results.

4.2.1 Text analysis

To better understand the determinants of subjects' choice between the Open and Closed task, we performed a textual analysis of the content of the written answers of subjects to the question "Why did you decide not to complete the other task?". Topic analysis performed by clustering the answers into three main topics and counting occurrences shows

that motivations can be classified into three main categories: pure tastes, performance-related concerns, task-related characteristics, such as the words that had to be used in the Closed task, or the 15 minutes allowed to complete each task (thus the task constraints). The results are summarized in Figure 2.

Figure 2: Text analysis of task choice motivations



Tastes are extremely relevant in both tasks: 58% of subjects choosing the Closed task and 65% choosing the Open task ($Z = 0.919$, $p = 0.358$, two-sample Wilcoxon rank-sum test) explain their choice by saying that one task was "more inspiring", "interesting" or "stimulating" than the other, using words referring to their "preference", "desire" or "appeal" for one task instead of the other. On the other hand, subjects who preferred the Closed task were mainly driven by performance-related concerns: 66% of those who choose the Closed task motivated their choice by mentioning aspects related to their expected ability: either they did not feel to be creative enough for the Open task, or not to have an idea that could be good enough, or did not have confidence enough in their success, or perceived the task as "too difficult", or entailing "too much pressure". This percentage was significantly lower for those opting for

the Open Task (47%: $z = 2.833$, $p = 0.004$, Wilcoxon rank sum test of two samples). Finally, a substantial percentage of respondents who choose the Open task (61%) justify this choice by referring to the characteristics of the unselected task, such as the presence of constraints, the words to be used compulsorily, and the limited time. This proportion drops to 39% for the Open task ($z = -2.482$, $p = 0.013$, Wilcoxon rank sum test of two samples).

4.3 Performance

Figure 3 shows the distributions of performance scores, based on external judges' assessment, in Open and Closed tasks across conditions. Table 3 and Table 4 describe the summary statistics of these scores.

Figure 3: Creativity Scores across Tasks and Conditions

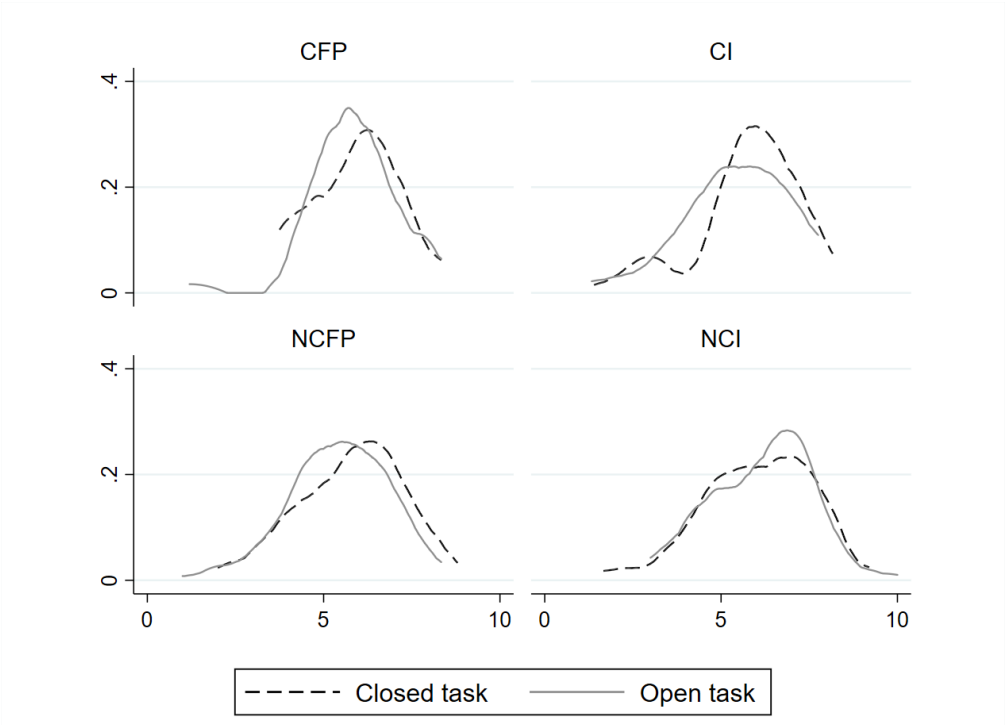


Table 3: Summary Statistics for Open task by Condition

Condition	Obs	Mean Score	Std. Dev.	Min Score	Max Score
NCFP	79	5.433	1.423	1.000	8.333
NCI	80	6.140	1.428	3.000	10.000
CFP	43	5.872	1.264	1.200	8.333
CI	34	5.447	1.510	1.333	7.750

As appears from Tables 3 and 4, allowing subjects to self-select into a task does not entail a significantly higher score. This is confirmed by non-parametric tests (Open task: $z = 0.296$,

Table 4: Summary Statistics for Closed task by Condition

Condition	Obs	Mean Score	Std. Dev.	Min Score	Max Score
NCFP	79	5.767	1.488	2.000	8.800
NCI	80	6.030	1.531	1.667	9.200
CFP	37	5.906	1.246	3.750	8.333
CI	46	5.781	1.495	1.400	8.167

$p = 0.767$, Wilcoxon rank sum test of two samples; Closed task: $z = -0.365$, $p = 0.715$, Wilcoxon rank sum test of two samples).

Besides the effective performance of subjects, as assessed through external judges' evaluations, we also collected information on absolute and relative creative performance as self-assessed by the subjects. For what concerns the effect of task openness on subjects' perceived performance, we observe that subjects rated their absolute performance higher in the Closed task than in the Open task ($z = -2.881$,$p = 0.004$, Wilcoxon signed rank test); the same happens for their relative self-assessed performance ($z = -3.621$,$p = 0.0003$, Wilcoxon signed rank test). Subjects thus appear more confident when dealing with the Closed task, probably because, as emphasized above, it is perceived as better defined and clearer in the goal to pursue, and so easier to make predictions about, in line with what emerged from text analysis.

Table 5: Summary Statistics for Self-assessed Task Performance by Condition

Variable	Obs	Mean	Std. Dev.	Min	Max
Absolute (Open)	236	5.9025	2.3199	1	10
Absolute (Closed)	242	6.4835	2.1388	1	10
Relative (Open)	236	4.9831	2.3283	1	10
Relative (Closed)	242	5.5826	2.2304	1	10

Absolute scores: "*How would you rate your creative performance in this task?*" - Relative scores: "*Do you think you performed better than the average of the other participants?*"

However, this does not translate into significantly higher average scores, neither when subjects have to complete both tasks ($t = 0.805$, $p = 0.422$, t-test), nor when they choose the Closed task ($z = 1.014$, $p = 0.386$, t-test). Notably, standard deviation is higher in the case of the Open task, consistently with the fact that open tasks potentially allow for the emergence of answers with a higher degree of creativity. In fact, higher variance means also higher potential creative outputs, which might not be reflected in the average scores. Since the results shown in Table 5 hold on average, a deeper look into the case of highly creative subjects becomes necessary. In particular, we are interested in understanding whether self-selection may act more on highly creative subjects or on less creative ones, having in mind that subjects choosing the Closed task are generally more confident in their performance

than subjects choosing the Open task, both in absolute and in relative terms.

We thus investigate whether the effect of self-selection on subjects' creative output differs at different points of the distribution of creative output. We use quantile regressions to estimate the conditional distribution of the creative output of subjects at each quintile [0,1] for both the Open and the Closed task, see 6. Table 6 presents quintile regressions (QR) from 1st to 4th for the Open task (Columns 1-4) and for the Closed task (Columns 5-8).

Table 6: Effect of self-selection on scores: Quantile regression

	Open				Closed			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Choice_Treatment	0.003	-0.040	-0.091	-0.253	-0.092	-0.038	-0.211	-0.417**
	[0.341]	[0.280]	[0.258]	[0.234]	[0.336]	[0.208]	[0.244]	[0.199]
Constant	2.525**	2.886***	4.695***	5.172***	2.728**	3.189***	4.629***	5.962***
	[1.135]	[0.931]	[0.856]	[0.778]	[1.165]	[0.723]	[0.845]	[0.691]
Observations	236	236	236	236	242	242	242	242

*** p<0.01, ** p<0.05, * p<0.1
Notes: Quantile regression (standard errors in parentheses). The dependent variable is the average score assigned by the external judges recruited on Prolific, and ranges from 1 to 10. Choice_Treatment is a dummy variable assuming value equal to 1 when the subject chooses to complete one of the two tasks (Treatment Choice), and 0 when she had to complete both (Treatment NoChoice). Controls include: incentives, gender, age, native language, risk attitude, ambiguity attitude, task order, how frequently the subject is engaged in creative tasks in a 1-10 scale, how much the subject enjoyed the task in a 1-10 scale.

The results show that choosing the task plays a significant, and *negative*, role only for very creative subjects, namely subjects in the highest quintile of the distribution of creative score, but only for the Closed task. On the contrary, it is not significant for subjects with lower performance and for subjects choosing the Open task. We interpret this finding as the consequence of the higher confidence exhibited by subjects in the Closed task, which increases self-selection and thus competition in the highest part of the distribution of creative scores, reducing those subjects' scores. Indeed, the number of subjects in each group who self-select in the Closed task (which captures the actual degree of competition) is higher than in the Open task (2.59 out of 5 versus 2.40, respectively). It is also important to note that, although external judges assign absolute scores in a 1-10 range, since they evaluate six answers each, it is implicit that their score reflects a comparison across the six answers.

5 Conclusions

This paper contributes to the literature on creativity by addressing the gap in research on the perception of Open and Closed tasks and its influence on task choice. Our findings confirm that tasks classified as "open" versus "closed" actually differ in whether goals are clearly defined, and how free to explore subjects feel when engaging in the task, thus validating the distinctness between the two types of task and its consequences. Moreover, this research offers insights into individuals' preferences and motivations in the realm of creativity

endeavors by exploring how people make choices between these types of tasks, and discussing the implications for real-world scenarios where individuals, such as employees, have the autonomy to decide which task to undertake. This aspect of the study not only enriches our understanding of creative engagement, but also provides valuable implications for designing work environments that align with personal and organizational goals. When considering task assignment in the workplace, it is not obvious whether individuals, particularly employers, should self-select into more creative or more routinized activities, or if it is more effective for employers to make these decisions on their behalf. Our findings reveal that people tend to choose tasks — whether open-ended or more structured — relying on their personal perceptions, which might differ from those of their employers. We also show that this tendency is further amplified in contexts where performance-based compensation is involved, showing that the presence of incentives makes perceptions more prominent. Interestingly, while self-selection does not imply superior absolute performance outcomes, the clarity that characterized closed tasks causes subjects to be more confident when estimating their performance in that task. Furthermore, constraints appear to have the positive effect of delimiting the scope of creative output, supporting the literature on the advantages of restrictions. However, the self-selection of the best performers in the closed task causes an increase in competition that offsets the returns of higher creative outputs, resulting in a detrimental effect of self-selection on creative scores for the most creative subjects. In conclusion, understanding and addressing employee perceptions of task features is crucial for principals and employers, suggesting implications for organizational strategies in task allocation and incentive structuring.

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Appendices

A Instructions and questionnaires (in-lab experiment)

The following instructions, translated from French to English, were presented to subjects during our in-lab experimental sessions for all conditions. Figure 4 presents the screens shown to subjects in the specific case of the NCFP condition.

General instructions

You are going to participate in a social science experiment. All your responses will be collected anonymously.
The experiment is divided into two parts, called "Part 1" and "Part 2". These instructions correspond to Part 1. You will receive the specific instructions for Part 2 once Part 1 is completed.
At the end of the experiment, you will be asked to complete a socio-demographic questionnaire.

Part 1

NCFP:

In this first part, you are part of a group of 5 participants and you will be asked to complete two tasks, each lasting 15 minutes. After finishing each task, you will be asked to answer a few questions.
In addition to the 6 euros that will be automatically credited to you at the end of your participation in this experiment, you will receive an additional payment of 9 euros for completing these tasks in the most creative way possible.
Your creative outputs will also be evaluated by five other participants who are not part of your group and ranked against those of four other participants. The ranking results will be communicated to you at the end of the experiment. However, your additional payment will not depend on this evaluation and will always amount to 9 euros.

The two tasks will appear successively on your screen, and we ask you to complete each task in the most creative way possible.

[The Open and the Closed tasks appear on the screens in a random order.]

[Start of the follow-up questionnaire]

Considering your first (second) task : [Instructions of the specific task.]

1. *To what extent did you like performing this task?* [1-10]
2. *How clear was the goal to be achieved in this task?* [1-10]
3. *To what extent did you feel free to explore in this task?* [1-10]
4. *How would you rate your creative performance in this task?* [1-10]
5. *Do you think you performed better than the average of the other participants?* [1-10]

NCI:

The NCI only differs from the NCFP condition due to a change in the payment structure.

In addition to the 6 euros that will be automatically paid to you at the end of your participation in this experiment, you may receive an additional payment for completing these tasks in the most creative way possible.
To determine this additional amount, your creative productions will be evaluated by 5 other participants who are not in your group and ranked against four other participants, and you will receive the amount corresponding to your ranking. You will receive 15 euros if you are first, 12 euros if you are second, 9 euros if you are third, 6 euros if you are fourth, and 3 euros if you are fifth. The ranking results will be communicated to you at the end of the experiment.
Note: Only one of the two tasks will be randomly selected to be actually paid. Each task has an equal 50% chance of being selected. So, make sure to put in equal effort for both, as they have an identical chance of being paid.

CFP:

In this first part, you are part of a group of 5 participants and you will be asked to complete a task for which you will have 15 minutes. After finishing this task, we will ask you to answer a few questions.
In addition to the 6 euros that will be automatically paid to you at the end of your participation in this experiment, you will receive an additional payment of 9 euros for completing this task in the most creative way possible.
Your creative productions will also be evaluated by 5 other participants who are not in your group and ranked against four other participants, and the ranking results will be communicated

to you at the end of the experiment. However, your additional payment will not depend on this evaluation and will always be 9 euros.

Among the two tasks that will be presented to you, we ask you to choose the one you wish to complete. As a reminder, we ask you to complete this task in the most creative way possible.

[The instructions of the Open and Closed tasks are presented on the screen.]

[Start of the follow-up questionnaire]

Chosen task : [Instructions of the specific task.]

1. *To what extent did you like performing this task?* [1-10]
2. *How clear was the goal to be achieved in this task?* [1-10]
3. *To what extent did you feel free to explore in this task?* [1-10]
4. *How would you rate your creative performance in this task?* [1-10]
5. *Do you think you performed better than the average of the other participants?* [1-10]

Unchosen task : [Instructions of the specific task.]

1. *How clear was the goal to be achieved in this task?* [1-10]
2. *To what extent did you feel free to explore in this task?* [1-10]
3. *Why did you prefer not to select this task compared to the other one?* [Open question]

CI:

The CI only differs from the CFP condition due to a change in the payment structure.

In addition to the 6 euros that will be automatically paid to you at the end of your participation in this experiment, you may receive an additional payment for completing this task in the most creative way possible.
To determine this additional amount, your creative production will be evaluated by 5 other participants who are not in your group and ranked against four other participants, and you

will receive the amount corresponding to your ranking. You will receive 15 euros if you are first, 12 euros if you are second, 9 euros if you are third, 6 euros if you are fourth, and 3 euros if you are fifth. The ranking results will be communicated to you at the end of the experiment.

Part 2

In this second part, you are asked to evaluate the creative productions of other participants for each task. For this, each person's texts will be displayed on your screen, and we will ask you to rank them. After this evaluation, we will ask you to fill out a socio-demographic questionnaire, and the results of your ranking will be revealed to you.
Please rank the five texts below in ascending order from the best to the least good, with no ties allowed between two texts.

Questionnaires

Sociodemographic and creativity-related information

1. You are: [Gender]
2. How old are you?
3. What is your level of education?
4. What is your field of study?
5. What is your native language?
6. In everyday life, how often do you engage in creative activities?
7. In everyday life, how much do you enjoy engaging in creative activities?

Risk and ambiguity questions

You have 100 units and can invest part of this amount in an asset with a 50% chance of success, which pays 2.5 times the invested amount in case of success. You can keep the uninvested units. Please note that a lottery will be played, consisting of a jar with 5 blue balls and 5 yellow balls. If a yellow ball is drawn, the invested amount will be multiplied by 2.5. If a blue ball is drawn, the invested amount will be lost. One of you will be randomly selected and paid based on the amount indicated in this question, with 100 units being equivalent to 1 euro. How much would you like to invest in this asset?

You have 100 units and can invest a portion of this amount in an asset whose chances of success are unknown, and which pays 2.5 times the amount invested in case of success. You can keep the uninvested units. Please note that a lottery will be played, which consists of a urn containing blue and yellow balls. You do not know how many yellow and blue balls are in the urn. If a yellow ball is drawn, the invested amount will be multiplied by 2.5. If a blue ball is drawn, the invested amount will be lost. One of you will be randomly selected and paid based on the amount indicated in this question, 100 units is equivalent to 1 euro. How much would you like to invest in this asset?

B Instructions for creativity assessment

The following instructions, translated from French to English, were presented to external judges who evaluated the creative outputs collected during in-lab experimental sessions. Figure 5 presents the screens shown to online external judges.

General Instructions

This study is conducted by university researchers. The objective of this research is to understand how people evaluate the responses of others.

The study has been approved by the Research Ethics Committee (CER) of the University of Strasbourg. Please note that all your responses will remain anonymous and will be treated confidentially. The researchers do not know your identity and will not be able to associate your name with the responses you provide.

By completing this questionnaire, you consent to participate in this study. Your participation is voluntary, and you may stop at any time. Payment is conditional upon the thorough completion of the entire questionnaire; however, you are free to exit the questionnaire at any time if you wish (all collected data will be deleted).

For any questions, you may contact Dr. Anne-Gaëlle Maltese at the following email address: ag.maltese@unistra.fr

If you agree to participate in this study, please select "Continue". If you do not wish to participate, please select "Exit".

Creative evaluation

Some responses were written in answer to the question: [Task instructions] *We will ask you to evaluate the level of creativity of these responses.*

[Scale from 1 (Not creative at all) to 10 (Extremely creative).]

Additional questions

1. What is your gender?
2. How old are you?
3. How often do you engage in creative activities?
4. How much do you enjoy engaging in creative activities?

Figure 4: Experimental Screens in the NCFP Condition (*Part 1*)

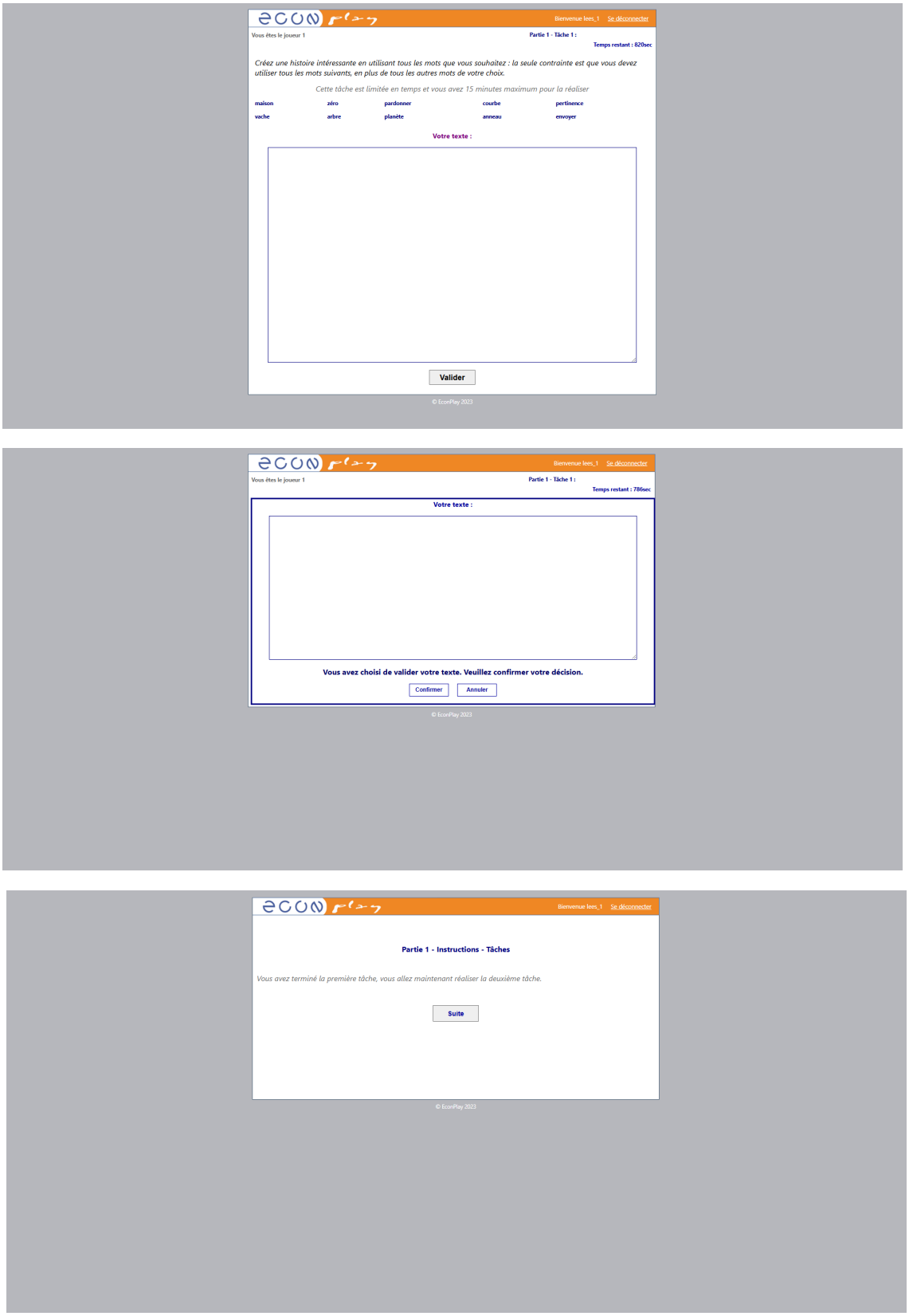


Figure 4: Experimental Screens in the NCFP Condition (*Part 2*)

Figure 4: Experimental Screens in the NCFP Condition (*Part 3*)

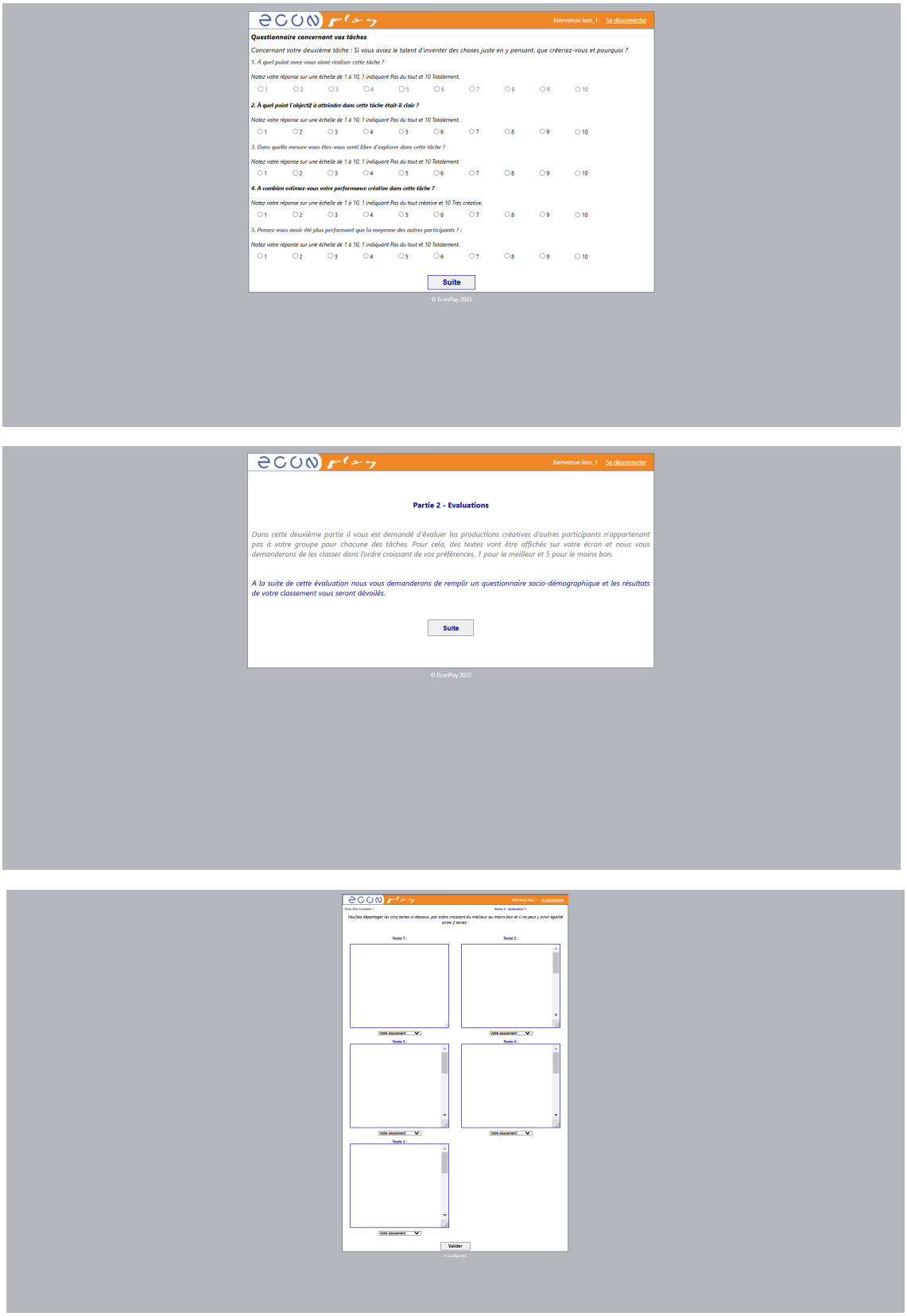
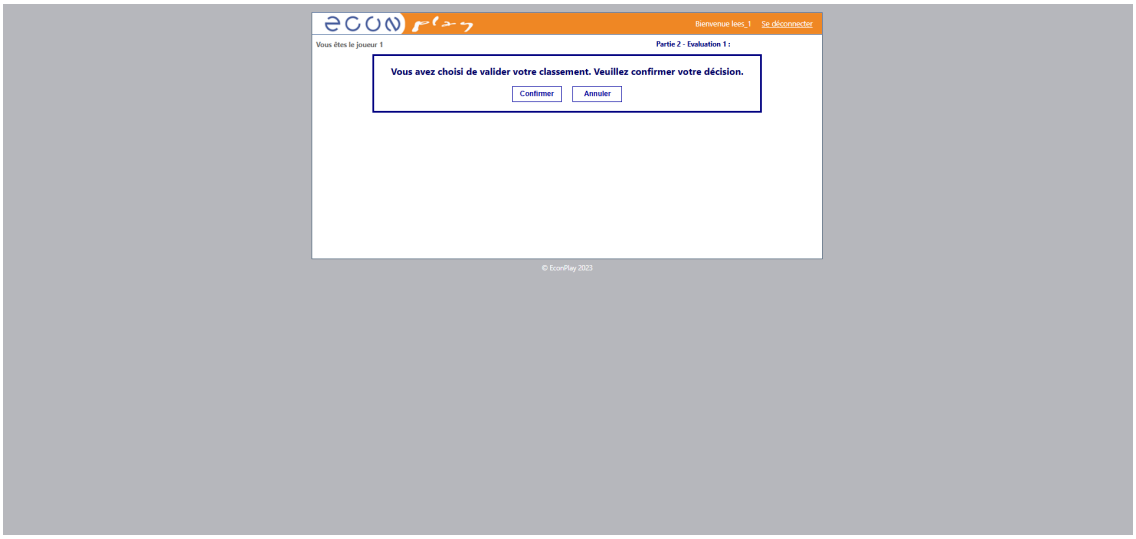
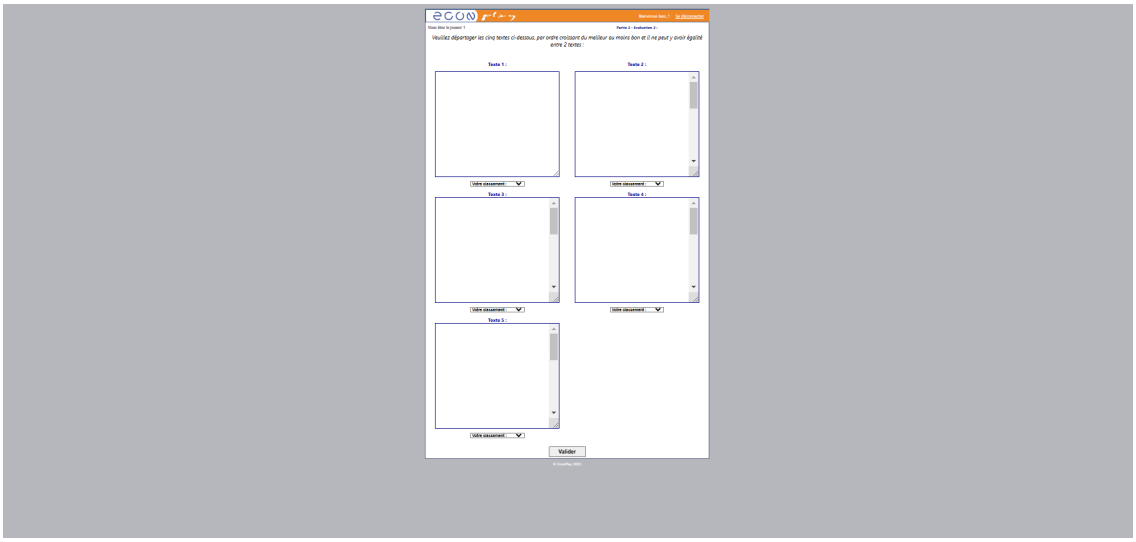


Figure 4: Experimental Screens in the NCFP Condition (*Part 4*)





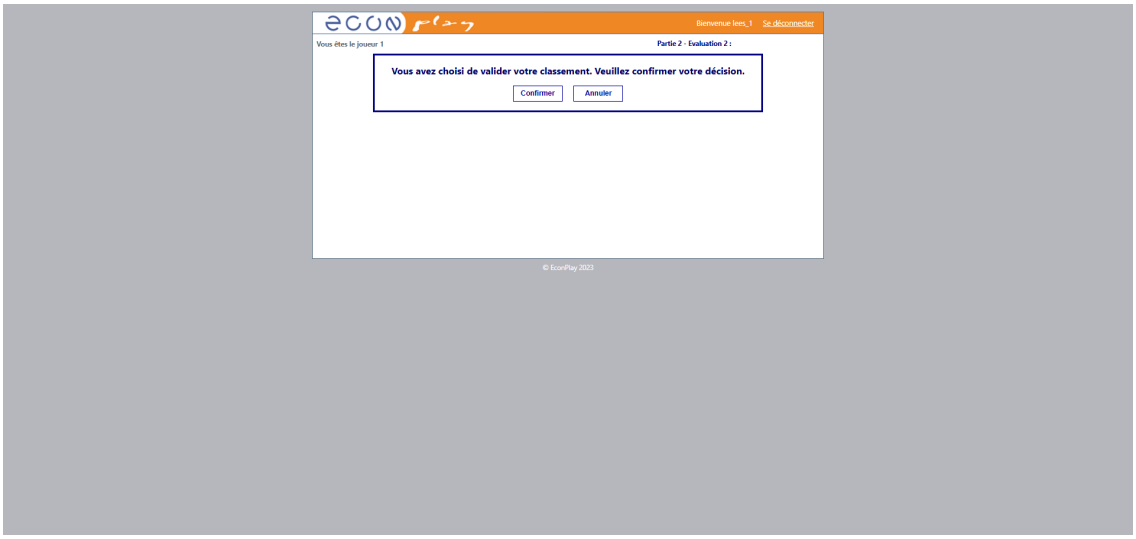


Figure 4: Experimental Screens in the NCFP Condition (*Part 5*)

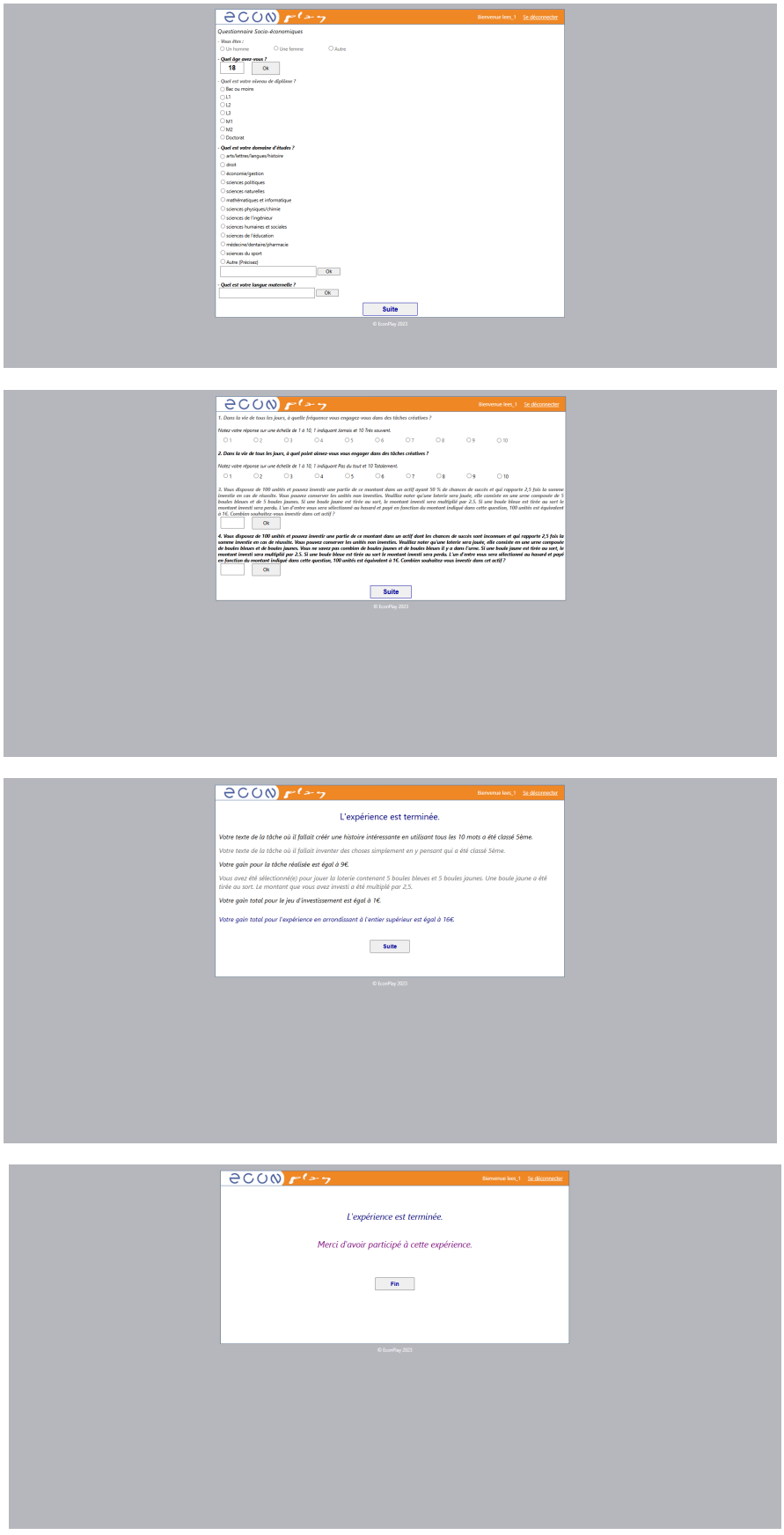


Figure 4: Experimental Screens in the NCFP Condition (*Part 6*)

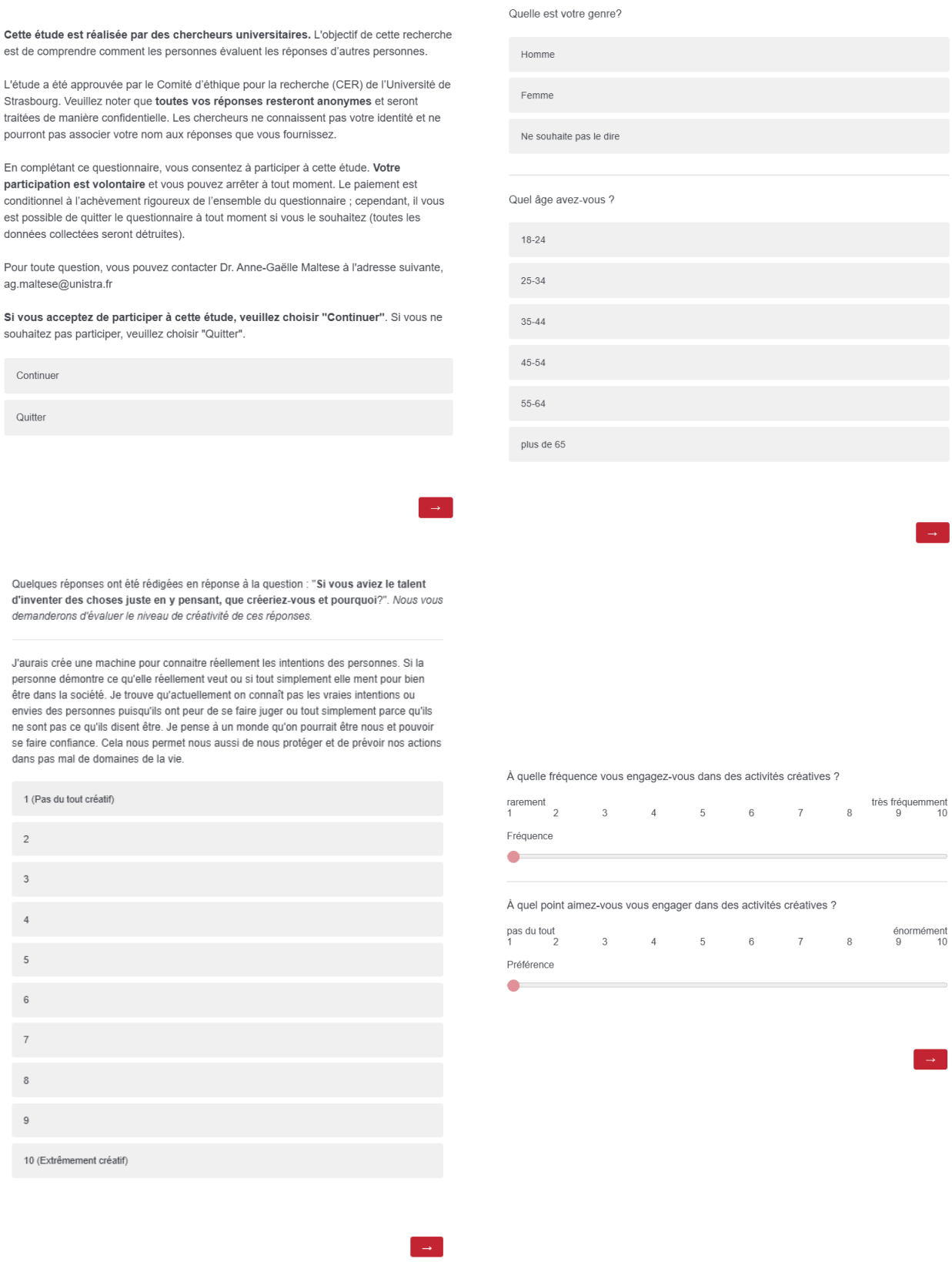


Figure 5: Evaluation Screens on Prolific