UNIVERSITY OF GLASGOW

DOCTORAL THESIS

Creative Output in a Market Context

Author:
Jaakko MIETTINEN, M.SC.

Supervisor:
Professor Sayantan Ghosal
Assistant Supervisor:
Professor Martin Kretschmer
Assistant Supervisor:
Dr. Theodore Koutmeridis

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Declaration of Authorship

I, Jaakko MIETTINEN, M.SC., declare that, except where explicit reference is made to the contribution of others, this thesis titled "Creative Output in a Market Context" is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

Jaakko Miettinen
Glasgow, December 12, 2019.

UNIVERSITY OF GLASGOW

Abstract

School of Social Sciences
Adam Smith Business School

Doctor of Philosophy in Economics

Creative Output in a Market Context

by Jaakko MIETTINEN, M.SC.

The main contributions of this thesis to existing literature is the introduction of a new methodology for researching the effect of copyright law on creative output using dynamic markets created in a lab experiment. The markets of interest are creative industries[1] where copyright is an important part of how the markets operate. Motivating creative production in such industries is more complex compared to motivating production in industries with more mechanic or algorithmic tasks. The methodology presented in the thesis is a contribution to existing literature on copyright and motivation, as previous literature does not utilise a dynamic experimental environment.

The results of this research indicate that both pay structure and the availability of information regarding the actions and performance of other competitors can influence creativity. There is some evidence that public information/attribution was important to market participants, as it in some cases provides an incentive for higher production and in other cases it cancels out an effect which are otherwise found when only tournament pay/economic rights were present. There is evidence of lower satisfaction in tournament pay/economic rights groups which suggest that individuals exert overconfidence before participating in the market causing lower satisfaction due to below expected performance. This might also result in over supply in winner-takes-all markets as participants overestimate the probability of their own success when entering the market. Besides this, the lower satisfaction could increase turnover in the creative industries and thus decrease overall human capital in the market as the unsuccessful experienced individuals leave the market due to low satisfaction.

[1] Examples of these markets are markets such as, book and music publishing

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Chapter 1

Introduction

The thesis is widely focused on the influences of reputation and tournament pay structures on creative performance. Which has applications in both creativity and copyright research. The aim is to study motivation and creativity as they pertain to and contribute to the discussion of the influence of copyright on creative production. A new experimental methodology is introduced to study these phenomena, using copyright as a foundation for the rules or boundaries of the experiment. Copyright is simplified as two external motivator's economic rights and attribution rights. In order to fit into a stylised market in experiments, the concepts of economic rights and attribution rights are further simplified to tournament pay and, reputation or performance pay, and public information respectively. The general question asked is: What motivates an individual to work on a piece of art or to come up with new publishable works/theories. How does pay structure and public information regarding the artist and other artists influence the way they compete in the market and their quantity and quality of the work?

The thesis is divided into six chapters. The current chapter being the first chapter introduces the motivation for the research in this thesis. The second chapter introduces and defines important concepts relevant to the research, the background of copyright and the markets in which they operate. The second chapter also discusses the advantages of using experiments in interdisciplinary research in more general terms. The third chapter focuses on the specific methodology of the experiments used, while the forth and the fifth chapters focus on discussing the results in terms of creative performance[1] and the influences of the market for individual participants[2], respectively. The sixth and final chapter concludes the thesis with a discussion summing up the findings and their relevance to other related findings available at the present time. Ultimately the goal of the thesis is to introduce a new experimental methodology for studying creativity in a market context and to demonstrate what these results can tell us about what motivates individual performance.

[1] Found in Chapter 4
[2] found in Chapter 5

1.1 Motives of the Research & Background Discussion

The current research evolves from the general question of why individuals want to become artists. This was due to my personal perception of the average artist earning less than the average individual[3] leading to questions such as: Why do people participate in these industries if they are paid poorly? What motivates artists? If artists are poor, then what motivates them; if not money, could it be reputation? Intellectual property rights are very closely tied to these questions and to some extent can even inform what artists view of how to induce creation as artists had a hand in creating copyright.

A background discussion to issues discussed in the thesis is found in Chapter 2. The full copyright discussion can be found in section 2.3. The philosophical justifications of copyright are discussed in section 2.3.1 which can give context to the arguments which underpin moral rights and the non-monetary perspective into copyright. The formation of what was considered the base common law copyright is discussed in 2.3.2 which mentions the artists role in the creation of copyright. The discussion in Chapter 2 continues with a discussion on fairness and satisfaction perceptions and how they can affect market outcomes and follows onto focus on interdisciplinary research in section 2.7. The section defines interdisciplinarity and discusses interdisciplinary research conducted when combining law, psychology, and economics and how the lab experiments can be used in order to promote a new interdisciplinary experimental methodology. The discussion continues to section 2.8.1 which focuses on cultural economics and welfare and highlights how cultural economics as a field, which the research in the thesis fits into, is different from economics more generally. The literature review chapter then moves to discussing differences between the experimental approaches of psychology and economics in 2.9. Finally, the chapter ends with a discussion on the difference between law and economics as subjects in 2.10. The discussion at the end of the chapter is designed to give some context to the research and show how it is interdisciplinary, how it fits into the three fields, and what type of methodology was used when designing the lab experiments in the thesis.

1.2 Contributions to Existing Literature

The main contribution of this thesis does not necessarily lie in the general questions which motivated the research[4] even though this research does contribute to what has already

[3]The research results showed that this assumption was generally correct. The market structure and overall monetary incentives for artists in the market are discussed in the section 2.4

[4]Questions such as, what motivates individuals? What motivates creativity or the production of creative goods? How do markets for creative markets operate? How does copyright influence these markets and influence the decision making of market participants?

been studied on the topic [5]. Existing research on the topics are discussed in sections 2.2, 2.5, 2.7, and 2.4. However, the main contribution of this thesis to previous research lies in the way the questions are approached detailed in the Chapter 3.

With the aid of the new methodology the thesis also aims to further the discussion found in previous experimental research in fields such as, economics more generally but specifically motivation[6], creativity[7], and copyright[8]. What is studied that is not found in current research is the individual, and especially the combined effect on the individual of the influence of performance pay and reputation on creative output. The observation of that potential combined effect contributes to existing research because it does not include any potential interaction effects between tournament pay and public information as a motive for creative production even though they have previously been studies separately.

Results are reported in Chapter 4 and in Chapter 5. How pay for performance and reputation influence the participants fairness and satisfaction perceptions are also observed as a part of the thesis, as found in section 2.6. The results and further discussion on the results are found in sections 4.4 and 5.4. The aim of this line of inquiry is to observe how the different market environments due to the existence or lack of tournament pay and public information influence the individual's perceptions of the market and how these perceptions could influence their future behaviour. The previous literature on the subject of fairness and satisfaction does not study these two variables combined effects in a dynamic market which is where the methodology contributes to past research. This past research on fairness and satisfaction is discussed in section 5.2 and the results and contribution to past literature on the subject is clarified in section 5.4.

1.2.1 Creativity, Creation, and the Market

The process of writing a book, composing a piece of music, or producing art has many aspects to the process that may be unique to the piece of work or process. Motivating the production of new and creative output in such industries can be complex. How individuals produce is highly dependent on environment and the individual themselves as discussed in 3.3. In the creative and innovation/innovative industries, laws exist that are designed to induce production and productivity[9]. This encouragement to create and innovate is then thought to contribute to the greater good by expanding the knowledge

[5] The results sections in chapter 4 and in chapter 5 discuss the results of the experiment in context of the relevant literature on the respective topics.

[6] Discussed in 2.2.

[7] Discussed in 3.4 and relevant studies cited in 2.2.

[8] Discussed in 2.5.

[9] Copyright and patent law both aim to induce productivity. Differences in these laws are discussed in sections 2.3.9.

and skill base of the industry these creators exist in. In turn this expanding knowledge base helps to fuel further creative thought, which again feeds the process of innovation and social advancement.

The aim of the thesis is to observe the influence of market mechanics on the creativity and productivity of market participants in the market for creative goods. More specifically, to deconstruct market incentives and observe how the incentives within the market influence creative performance and the production of creative goods. Copyright and the creative industries are historically closely interconnected, and market structure is heavily affected by copyright law. This is why there is a section devoted to copyright in Chapter 2 and a deep dive into the justification for, and the history of copyright which will give context to the experimental structure detailed in Chapter 3.

The market for creative goods is simulated in an experimental or stylised market by manipulating the information and pay structure present in the market, as copyright affects both elements by guaranteeing attribution rights and economic rights, respectively. Attribution rights, the right to be named as the author, is manipulated in the experiment by controlling information available in the stylised market. Individuals in a treatment group with attribution had full and instant information about who is creating what in the market. Those individuals who were not in such a treatment group were not informed of the author of the creations they were observing. In the economics rights treatment groups the individuals were paid based on performance, whereby the pay structure present in the market for creative goods was either a tournament pay structure or a winner-takes-all pay structure. An individual not in an economic rights treatment group did not receive performance pay, but rather a set payment. Thus the economic right treatment group is referred to as the tournament pay group and the attribution treatment groups will be referred to as the public information treatment groups.

The stylised market is not designed to be a perfect proxy for the creative marketplace, but rather a tool to better understand how creativity is affected by performance pay and attribution. To put this question in more general terms, how do tournament pay and public information influence creative performance? Do incentives present in a tournament pay structure have any influence on the overall creativity of output? Does the availability of public information about the actions of other market participant affect the creativity of individuals in the market? What about when both of these incentives are present simultaneously rather than individually, will there be interaction effects? The creative markets are unique, as it is not fully known how successful or financially lucrative a song, book, or film will be. This is referred to as the "nobody-knows" principle by Caves and is an important principle when discussing the markets for creative goods (Caves, 2002, p. 3).

The study examines both creativity scores using an existing rubric found in psychology literature to judge creativity and also uses subjective scores submitted by participants during the experiment to observe how varying market environments influence creativity and given subjective judgements of the output. The combination of the two types of creativity i.e. rubric based and subjectively measured creativity is an important part of the methodology. This adds to current research because not only can the markets influence be measured by comparing different market environments, but the measurement method is multidimensional and can strengthen the reliability of the results. This highlights the contribution of this research as it combines previous tired and tested research from the field of economics, law, and psychology into one experiment. The market analysis is from economics, a tried and tested methodological base for creativity research found in psychology, and the context for the market being analysed i.e. the creative markets relevant to copyright law. This type of multidisciplinary and multidimensional approach is what gives the research found in this thesis a promising potential for a unique research agenda in the future.

It can be argued that to create something ingenious or awe-inspiring there must be some type of kind of equivalent pain or manic devotion to one's craft. This aspect of creation will also be discussed in order to gain more insights into what is creative or creativity and what type of people succeed in the field of creative production. To gain insights into the individuals within the markets for creative goods, questions are discussed such as, is creativity genetic? or are all artists poor? This in turn will support a discussion of market mechanisms with the individual market participant in mind to try and understand what can inspire creativity.

1.3 Conclusion

The part of the thesis which is most likely to be a contribution is the experimental set-up. Experiments are used in creativity research, and they are common in economics, but it is a relatively rarely used tool in the field of copyright law[10]. The type of dynamic market created is a completely novel set up which has its foundations in creativity research and copyright research and contributes new experimental methods for potential use in all three of the mentioned fields. The aim has been to step away from a relatively rigid classic experimental set-up with few moving variables towards a more dynamic market like structure with instant interaction and feedback. The motivation for this was to work toward being able to simulate markets more effectively using experiments which could in turn be extended and implemented more generally.

[10]Some examples of such experiments are discussed in section refdirectly related studies

The methodology has its foundations in creativity research and in copyright law along with what is found in industrial organisation literature related to creative industries. These subjects are essential for laying the groundwork for the thesis and so the following chapter will be devoted to background discussion preparing for the methodology section and results sections. The discussion will begin by defining the key concept, creativity. After that the discussion will delve into the history of copyright which will help to explain the history of copyright and how copyright has been justified. This is important because it will provide wider context to a later discussion of creativity and the problems arising when trying to boost creative production. The discussion will also include sections on how the study fits in with similar studies in subject areas such as, law, economics of law, psychology, and cultural economics research.

Chapter 2

Literature Review

The focus of the beginning of this chapter is to walk through the concepts of creativity and measuring creativity. The relevance of these concepts when discussing copyright law, based on the justifications of this law, and the history of the law itself are addressed. Differences in the philosophy behind the law in continental Europe and the U.K. is also discussed. This allows for an elaboration on the discussion of attribution rights and economic rights, or public information and tournament pay respectively, and their potential effects on creative performance. In addition the chapter includes a discussion on the subjects of law, economics of law, cultural economics, psychology, and experimental economics in order to help place where the thesis sits in respect to these subject areas.

2.1 Defining Creativity

Before we can look deeper into the factors affecting creativity we must first have a working definition of creativity. Definitions of creativity from the 19th century provide good foundation to start the search for a working definition, they described creativity as something new and important, focusing on issues, such as, types of creativity, intellectual components, and the creative process (Baker and Cunningham, 2009). Creativity can be seen as process involved with sensing gaps/missing elements, forming ideas or hypothesis based on the ideas, testing the hypothesis and communicating the results, and possibly modifying the original hypothesis if necessary (Torrance, 1962, p. 3). This definition of creativity is slightly more science specific with references to hypothesis testing and finding "gaps" in the knowledge, although this thought process can also be applied to creating art as the idea must first be created and tested to see if it is in some way novel, and if not then modified or discarded.

For a more general definition it is theorised that creativity should contain four main points: It should contain attributes that are novel and useful, have attributes of the person generating the creation, attributes of the people assessing the creativity of the creations,

and attributes of the environment, such as, source of evaluation, resource and inspiration for creation (Batey and Furnham, 2006). This is quite a comprehensive way to define creativity as it considers the internal and external influences of the creative endeavour. Where most definitions differ is the extent to which their proponents/creators are attempting to identify creativity as a generic human characteristic or to define what makes creative individuals somehow different from the rest of the population (Sharp, 2006). Using this definition there is an assumption that creativity is somehow exclusive to those who have creative talent or abilities, which is not strictly true as people have been found to be creative without needing to have creative talent, although the more creatively talented might be consistently more creative. Overall, when talking about creativity it is assumed that there is a greater importance of describing those qualities that enable a person to visualise unrecognized associations and invent new ideas (Karlsson, 1978, p. 98). In the context of an experiment it is more appropriate to use a more operational definition of creativity compared to a conceptual definition since conceptual definitions do not translate into assessment criterion as operational definitions do (Amabile, 1983). It is, however useful to have a conceptual definition as well to have a more rounded understanding of the concept of creativity more generally. Thus, for the sake of simplicity creativity can be thought of as something made using old or existing knowledge and material to create something new and novel. The operational definitions are task specific and are discussed in more detail when the creativity tasks are discussed in the method chapter, for example, creativity tests are judged based on concepts that are defined, and those concepts define creativity in the context of the test.

2.1.1 Creativity Versus Novelty Seeking

Novelty seeking is seeking to create something novel, the difference here is that it can be novel is not necessarily creative but simply new. It can be more exploratory than creative where a someone who is novelty seeking is something new to them. For example, if an individual makes a simplistic rude joke it might not be creative, but it can be novelty seeking. Whereas a creative joke is often more complicated in its use of allegory or metaphor and is likely something which requires a unique perspective or expression. Novelty seeking can be considered a necessary but not sufficient condition to creativity, as something creative is new but the newness itself is not enough for something to be creative. Innovation on the other hand is close to what one might consider creativity but has a transformative quality to it. For example an invention can be creative but ultimately useless, while an innovation is an invention which is useful and fill an existing need or a creates something which transforms the way individuals live. Examples of such innovations include computers, phones, and the internet to name a few. To some extent

creativity can be considered a necessary but not a sufficient factor for innovation as one needs to be creative to be innovative but creativity itself is not enough for something to be innovative.

The experiments presented in the thesis study what influences creativity and does avoid the testing for novelty seeking while to some extent capturing what could influence innovation as well. The experiments avoid studying only novelty seeking because there are specific creativity criterion used to measure creativity which measure 4 different aspects of what can be considered creativity[1]. To some extent these measures are measuring the novelty seeking aspect of creativity, and the measures can all be relevant to both novelty seeking and creativity however something novelty seeking is likely to only be relevant to a few of the measures while something creative will be relevant to all 4 measures. For example, something novelty seeking might be humorous but is unlikely to be original and be something which is categorically completely different to what the person has already submitted. This is because novelty seeking is simply seeking something new without a focus on the overall quality of the newness.

Creativity and innovation are connected and in the experiment, there is a task, the divergent thinking task, where they are quite closely connected. This because the point of the task is to find uses for a stimuli item, in this case a paper clip. This thought process is close to innovativeness because there needs to be some use created for an existing item which is a part of what an innovation is. As discussed before this is not only what innovation is but there are strong parallels which is why the results can help to inform how innovative behaviour could be influenced by the treatments in the experiments. This is not to say that there would be a one to one correlation between how the treatments influence the creativity tested in the experiment and innovative quality. However, there is likely to be some parallels because of the closeness of the two processes in the first creativity task.

2.2 Constituents of Motivation

This section focuses on motivation and what influences an individual to start and complete a task. Specifically, the discussion focuses on what influences creativity. Creativity is something new and important or it can be seen as a process involving sensing gaps/missing elements, forming hypothesis and testing them (Torrance, 1962; Baker, 1978, p. 3). This can be extended to art and novels, among others, to say that they are creative products or products which aim to highlight a new perspective or bring out a new aesthetic or theme. What is new or novel can be quite subjective and can depend

[1]There 4 measures are fluency, flexibility, originality, and humour as detailed in chapter 3.

on the task. Giving a situation specific definition of creativity can be especially useful if individuals are given creativity contingent rewards or rewards which depend on the creativity level of the individual's products or output.

The current section continues on to discuss motivation varying circumstances and lays the ground work for a more detailed discussion about market incentives later in the chapter. To lay some groundwork for the discussion on motivation a few concepts are outlined. Firstly, when performance or completion goals are discussed they refer to thresholds or benchmarks of performance below which the goal has not been met. Completion goal is a goal of completing whatever the task is at hand. This is similar to creativity contingent pay which is pay based on how creative one's product is. These are different as a goal is a set level while creativity contingent, or any other contingent pay, is pay based on the overall level of creativity. This distinction is important as the set goals are known and fixed while creativity contingent pay is not fixed and increases as the level of creativity increases. The creativity contingent goals can potentially be relative to others performance, although they can be a combination of set levels also. Tournament pay based on creativity is a very specific type of creativity contingent pay where the top performers in the group or population earn most if not all of the possible rewards. This is inherently unequal and interesting to discuss how these types of pay structures motivate performance, be it creative or not.

2.2.1 Goal Setting

A goal can come from two types of sources; they can be given from an external source, such as a manager or be from the person themselves in which case it is an internal motivator. Who sets the goal, and how it is implemented, is important. If the goal is from an external source it can be viewed as controlling. If it is from an internal source, the person themselves, their performance is more effective in heuristic tasks such as creativity (Deci and Ryan, 2008). This can help explain why success in long term goals has been associated not only with talent but with a "grit" describing the individual's level of "stick-to-itiveness" (Duckworth et al., 2007). External motivators are not all counterproductive, because if a payment scheme, which tolerates early failure and rewards long-term success is implemented, it can perform better than pay-per-performance or fixed-wage incentive schemes (Ederer and Manso, 2013). It is important to keep goals in perspective and if possible to avoid effects such as narrowing focus which leads to the neglect of non-goal areas and reduction in intrinsic motivation (Ordóñez et al., 2009). One must set the correct type of goals for example a learning goal, to foster persistence and task enjoyment and avoid performance related goals which can cause lower performance (Dweck, 2000; Mueller and Dweck, 1998, p. 16-17). This can also be relevant to the standards of what

type of product is popular in the market, because it depends on how these market incentives are perceived by the creators. If they are perceived as performance goals and not learning goals it could be problematic in terms of optimality of the motivator.

2.2.2 Motivating Creativity

Motivating creativity can be very different compared to motivating other types of tasks or performance and can be divided into many different aspects. How exactly creativity can be motivated is the focus of the next section to give some background about how complex it can be and how this complexity can then be used to inform debate about creative markets and the philosophy of copyright law. Copyright law specifically, as detailed later, is designed as an incentive for the arts and creativity. Thus, justification for copyright law is best discussed after a discussion about motivating creativity to create a solid background for the discussion of incentives promoted by copyright. When motivation is discussed it is split into two types, intrinsic and extrinsic motivation. Intrinsic motivation is motivation that comes from within the person themselves. Extrinsic motivation is motivation which originates from outside the individual and can include monetary rewards or feedback from others, for example.

Creativity is a process that requires a heuristic or open-ended approach compared to algorithmic tasks that have a single obvious solution (Amabile and Pillemer, 2012). Creativity, when it comes to the cognitive process, is unique. It would be logical to think that motivating creativity could also be different to motivating tasks that are algorithmic in nature and so deserves to be considered separately. In general, there is agreement in the literature that intrinsic motivation is an important part, if not the most important part, of motivating creativity (Amabile, 1997; Eisenberger, Haskins, and Gambleton, 1999; Grant and Berry, 2011; Lakhani and Wolf, 2003; Morningstar, 2012; Shalley and Perry-Smith, 2001; Stanko-Kaczmarek, 2012).When individuals contribute to non-profit projects like open source software the most prominent driver is enjoyment-based intrinsic motivation even though 40% of respondents were being paid for their efforts (Lakhani and Wolf, 2003). When intrinsic qualities and external motives are emphasised before subjects took part in a creativity task it was found that subjects in the intrinsically motivated group performed better than the extrinsically motivated ones (Stanko-Kaczmarek, 2012). However, the study did not use money as an extrinsic motivator which, intuitively speaking, can be seen as the strongest of the extrinsic motivators. Even though monetary incentives might be the strongest extrinsic motivator in some cases other extrinsic motivators, such as prosocial motivators, can be just as effective if not more effective. Prosocial meaning, to benefit others, such as charity or volunteering, and a prosocial motive being a motivation to help others. How the external motivator is administered is important, if it is

administered in a controlling way it could decrease intrinsic motivation and thus performance. However, if the external motivator is administered in a constructive fashion which recognises people's competence, the motivators effect on creative performance is more likely to be positive (Amabile and Pillemer, 2012). This is supported by findings that prosocial motivators i.e. motivators, such as, helping a cooperative unit, encourages employees to develop ideas and strengthens the association between intrinsic motivation and independent creativity (Grant and Berry, 2011).

When monetary external motivators are used to motivate creativity, the picture becomes slightly complex as it also depends on what kind of external motivator is used (Byron and Khazanchi, 2012; Chen, Williamson, and Zhou, 2012; Eisenberger and Cameron, 1996; Eisenberger, Haskins, and Gambleton, 1999). When creative, performance, and completion goals were incentivised using monetary incentives it was found that the creativity contingent rewards increased creativity while performance and completion contingent rewards had slightly negative effects on creative performance (Byron and Khazanchi, 2012). Extrinsic rewards, in tasks that were adaptive style/complex and innovative style/simple jobs, decreased creative performance as extrinsic motivators increased, supporting the idea that extrinsic rewards are detrimental in heuristic tasks, but did not affect creativity in innovative style/complex tasks (Baer, Oldham, and Cummings, 2003). This shows that researchers need to be careful what type of goals or instructions are given when testing for the effect of extrinsic motivators on performance since the outcome can be different if creative contingent rewards are used instead of performance contingent rewards. It is also relevant in the markets for creative goods as the effectiveness of the motivators present can depend how they are perceived.

A possible explanation for the difference in performance and creativity contingent tasks could be that when instructed to "be creative" the creative performance increased (Harrington, 1975; Niu and Liu, 2009). The increase in creativity in the creative contingent condition could be due to the knowledge of being judged in terms of creativity, in essence being told to "be creative". This could motivate to be more creative in contrast to it being just the monetary incentive increasing creative performance. Pay-out structure also matters, for example, tournament structured rewards for group creativity were found to be more effective than piece-rate rewards, i.e. fixed pay regardless of performance, in inducing creative production (Chen, Williamson, and Zhou, 2012).

If incentives are given in an environment where there is tolerance for early failures and reward for long term success then the incentives are more effective in motivating innovation compared to fixed-wage or pay-for-performance incentives (Eisenberg and Thompson, 2011). The importance of the type of incentive and the environment the reward it is administered in further highlights the importance of how market participants

perceive the incentives. The results detailed in the following chapters can help to give more information about how market participants view the incentives present in the market. They can also help to pinpoint what type of incentives are perceived to be present in the complex market. The subject's prior experience with the relevant task also influences how effective the rewards are, if the subject has had prior experience in the creative task, and were then given a reward to do it again, their creativity increased compared to if they did not have prior experience (Eisenberger, Haskins, and Gambleton, 1999). Simply saying that monetary rewards are or are not effective ignoring the intricacies of the different types of monetary rewards and the context in which they are given which also has an effect on the overall effectiveness of the rewards.

2.2.3 Intrinsic Versus Extrinsic Motivation

The correlation between extrinsic and intrinsic motivation is not always clear when incentivising creativity as detailed by the over justification theory which describes how extrinsic constraints, in the form of extrinsic motivators, can decrease intrinsic motivation (Glover, Ronning, and Reynolds, 1989). In addition to this it has been found that when extrinsic motivators such as, the quality and creative measures are introduced in a creativity weighted pay scheme the creative production was lower than when there was only a quality measure (Kachelmeier, Reichert, and Williamson, 2008). This would suggest that if an extrinsic motivation was introduced it would decrease performance. However, it is not certain because extrinsic motivators can be effective, but when compared with intrinsic motivators, been found to be less effective (Morningstar, 2012). This however does not mean that extrinsic motivators are not effective, but care needs to be taken when talking about their effectiveness in motivating creativity. This is especially relevant in terms of the effectiveness of copyright in incentivising creation. If the motives are assumed to increase creativity over all categories of creativity in a wide variety of situations it should be robustly proven through empirical evidence.

This is especially relevant as constraints, such as an imposed theme, constrained information, or certain objectives, have been found to increase creativity only in cases where the constraint was malleable (Medeiros, Partlow, and Mumford, 2014). However, constraints like copyright and high licencing fees[2] and the orphan works[3] problem brought on by it could be too rigid to work around. The interaction between intrinsic and extrinsic motivation is a key aspect of the impact of market incentives and copyright on creativity.

[2]licensing fees are fees which are paid in order to be able to use or display a copyrighted work. It also is relevant for patents where a patent can be licenced and then used in a product, for example.

[3]Orphan works are works, such as books or art pieces in copyright but which have fallen out of use to the point that it is hard to find the copyright holder. This is especially problematic for sequential production where an artist may want to license a work but be unable to find the copyright owner of the work.

It is useful to focus on these two main groups when discussing incentives in the markets for creative goods. This helps to streamline the discussion for later chapters but also is a solid foundation for the discussion of the philosophy of copyright. Copyright has a large influence on the market for creative goods as it creates an artificial monopoly for the creator of a copyrighted work, this in turn can change how an individual acts in the market compared to a scenario with no copyright. For example, they might change their current effort decisions, and change what they create based on existing works.

2.3 Review of Copyright Law and Related Issues

The philosophical ideals behind copyright are important to understand the underlying justifications for the laws and the philosophical reasoning behind them. The philosophical background also gives some insight into what is prioritised in different countries and how these priorities formed the legal systems within the country, specifically differences between civil and common law countries[4]. Knowing the philosophical background makes it easier to dissect the arguments used to justify copyright. This makes it clearer to see why copyright manifests itself in the way it does. For example, if the copyright in a country is justified using the utilitarian argument rather than the natural rights argument then it is more understandable that there is more of an emphasis on economic rights rather than authors or moral rights.

2.3.1 Rights and Background Philosophical Ideas

Before going into copyright related issues, it is important to set out what is meant by "copyright" or even a "right". The Stanford encyclopaedia defines rights as follows: "Rights dominate modern understanding of what actions are permissible and which institutions are just. Rights structure the form of governments, the content of laws, and shape of morality as it is currently perceived. To accept a set of rights is to approve a distribution of freedom and authority, and so to endorse a certain view of what may, must and must not be done." (Wenar, 2011). Thus, if life was seen as a right, then laws would be written to distribute these rights for everyone under the jurisdiction of the law. Institutions like the police and the court system would be created to protect these rights, and individual freedoms would not be extended to allow for murder. By extension legal rights are rights which are extended to people under the rules of legal systems or by a decision of an authoritative body (Wenar, 2011). Rights are more general and legal rights are

[4] An example of a common law country is the UK or Australia, a civil law countries include France or Germany. All Continental European countries are civil law countries.

rights in context of the law or authoritative body so legal rights are slightly more specific and exist in slightly more constrained circumstances than rights in general.

A copyright is a monopoly given to authors over their works, in order to give author's the incentive to create and disseminate work of social value, it also can be given to an author who is seen to "deserve" compensation for their contribution even if it did not induce them to create (Sterk, 1996). One of its purposes is to address the problem of free riding which is when "pirates" copy the creators work without needing to pay for any fixed costs, thus being able to undercut the price set by the original creator. To combat this problem the creator is given a monopoly over their work so that they can charge a higher price compared to marginal cost and recover their fixed costs[5] (Towse, 2014). Copyright attempts to solve problem of free copying by giving the author property rights over their creation and so control of their work, this way the author is given the potential to financially benefit from their work and potentially have more opportunity to create more socially valuable works later. This argument is heavily based on Locke's argument for property rights, where he argues that the fruits of one's labour are their property and that they have an exclusive right to it because it is earned through their labour (Locke and Laslett, 1988, p 289-290). Locke outlined the right to property or a property by stating that people had a natural or automatic right to their body. Therefore by extension they have a right to the product of their labour. Addittionally, if an individual mixed their labour with an unowned object then the individual became entitled to that object as their property (Locke and Laslett, 1988, p. 287-288).

Moral rights are a part of the continental European author's rights which are non-monetary in nature, many countries, like the United States, do not recognise moral rights which was a large reason why the United States did not ratify the Berne Convention[6] until much later (Drahos, 2002, p. 196; Mills, 2011). Moral rights include a collection of four legal entitlements; the right of disclosure which allows the artist to refuse to expose his work, the right to retraction i.e. right to retract their work from the public view, the right of attribution or right to be named the author, and the right of integrity which allows the artist to prevent destruction and alteration of their work (Mills, 2011). Moral rights have been strongly influenced by Kant who argued that creation was a manifestation of the creator's personality and thus the author had inalienable right to their creation. This is derived from their right to communicate their ideas and so is a personality rather than property right (Suhl, 2001). Interestingly the United States, a country where freedom of speech is strongly protected, they do not have a strong culture of moral rights

[5]Thee fixed costs can include anything from time spent creating to costs of materials. Thus the extrinsic motive of copyright is a catch all in terms of the types of costs of creation which it coveres.

[6]The Berne Convention is an international copyright agreement where countries agreed to enforce copyright from any member state in all member state.

in copyright, even though moral rights derive from the idea of freedom of expression the same freedom that is guaranteed by the first amendment of the United States Constitution. This phenomena could be partially explained by Thomas Jefferson, who was an important figure in drafting the constitution, rejecting any natural rights foundation for granting control to authors and so focusing more on the economic rights of copyright (Moore, 2003).

A natural right is a right which is automatic and given without formalities, in context of copyright, when an artist finishes a work the copyright is a natural right if the author automatically receives a copyright in the work without needing to register the work (Bently, Suthersanen, and Torremans, 2010). Both Kant and Locke use the concept of a natural right when they argue for an existence of artist's rights and property rights (Locke and Laslett, 1988, p. 289-290; Mills, 2011). Thus there is more importance put on the artistic work compared to other forms of property because there is an idea that the work is a manifestation of a person's personality. This is similar to intrinsic value given to object like gifts that can be connected to the personality of the gift giver. Conversely Locke argued that the individual's labour separates private property from the commons. Additionally, once the individuals labour was mixed with an unowned resource, the product would be the labourer's inalienable property and hence permits the individual a natural right to the fruits of their labour (Locke and Laslett, 1988, p. 287-288).

Economic rights, according to the Copyright, Designs and Patent Act 1988, include the right to copy, issue, rent, or lend copies to the public, perform, to communicate work in public, and to make adaptations of the work (*Copyright, Designs and Patents Act* 1988). Anglo Saxon copyright law such as, the UK and US copyright, emphasise economic rights while in civil law countries the emphasis is on authors' rights with moral rights an integral being an integral feature of those rights (Towse, Handke, and Stepan, 2008). However the difference in these two rights is shrinking due to a deliberate policy of harmonisation and by the trade in cultural goods and services (Towse, Handke, and Stepan, 2008). Economic rights are important when talking about the utilitarian rationale since the rationale depends on incentive to create stemming from economic incentives given by a monopoly over one's creation. The utilitarian argument for copyright being when creators are granted control over their work is argued to give them incentive to create. This way society can maximise social utility as the benefit from the policy is seen to be larger than any other alternative action or policy (Moore, 2003).

2.3.2 Historical Background of Common Law Copyright

Given that there is a clear philosophical background to explain and rationalise copyright, it is worth looking more closely at the origins of modern copyright, and the rationale used

to justify it, specifically in the UK. The reason the UK is a worthwhile point of reference is that it has provided the base for mny of the world's copyright regimes. This is due to the UK being a former colonial power and therefore it has influenced the legal institutions adopted in its former colonies. Countries like India, Australia, and the US have been directly influenced by copyright laws enacted in the UK and their copyright laws are specifically heavily influenced by the Statute of Anne (Bracha and Syed, 2013; Davis, 2012; Panda, 2007). The US being one of the largest and most influential economies in the world makes the Statute of Anne, and the rationale for it especially crucial if one is to understand modern copyright and why it is structured the way it is globally. A brief history of UK copyright is discussed before delving into the rationale used to justify the Statute of Anne and modern copyright in the UK. After which the effect of the Berne Convention and TRIPS agreement[7] has on global copyright and thus developed and developing nations is discussed.

Legislation comparable to copyright has existed in the UK for many centuries and has evolved along with the times reflection the political climate and popular opinion of the times. After royal charter of 1557 there was no copyright, per se, in the UK, but a system of censorship where stationers companies were given control of what to print and who could print it by the government in return for adhering to the rules set by the government on what could and could not be printed. This monopoly over book printing was not done to secure stationers or publishers rights but rather to establish a more effective system of government surveillance (Rose, 1993, p. 12). Therefore this was similar to a copyright in the sense that it granted a monopoly over printing but the rationale was based on control rather than the encouragement of ideas. This reflected the crowns wishes to quash political and religious dissent by controlling who could publish and what they could publish. The stationers' company, on the other hand, wanted to regulate trade, restrict reprints, and consolidate market power over publishing to concentrate power among its members. These two entities shared the same motive and coincided for years being regulated by star chamber decrees (Alexander, 2010, p. 18). This dynamic slowly started to change as the book trade became more competitive between publishers who started to recognise authors' rights (Feather, 1994, p. 4-5). This change was evident when the world's first copyright statute, the Statute of Anne, was enacted in 1710 it shifted overall focus from censorship to ownership reflecting a shift overall in mind set toward the authors' overall interests compared to the interests of stationers' and government censorship (Feather, 1994, p. 4; Rose, 1993, p. 48).

There were a few crucial differences after the Statute of Anne was enacted, the right

[7] Is a legal agreement among nations of the WTO which sets out minimum standards for intellectual property protection.

to copy was no longer in perpetuity but confined to an initial terms of 14 years and additional 14 years if the author was still alive for new works and 21 years, until 1731, for old works. The act also transferred the property right to the authors instead of to the stationers who had the property rights assigned to them before the act (Bonham-Carter, 1978, p. 16). This was influenced with authors like Defoe pushing for a law that gave authors the right to their work in order to encourage learning, which in turn inspired the stationers to lobby parliament using similar rhetoric in order to secure publishing rights (Deazley, 2004, p. 32-33). The reason this is especially significant because it is the first time the utilitarian rationale was used to justifying the need for a copyright and the first copyright law which set a president for future rationale for copyright.

2.3.3 Utilitarian Argument

The utilitarian argument hinges on the idea that economic incentives given by copyright promotes the creation of new works which are then granted a monopoly to allow the authors to recover their fixed costs. Knowing this, the authors receive a monopoly which gives them the incentive to create and dissemination of new works and ideas by authors. This benefits society by protecting private returns, increasing overall knowledge, and amount of welfare increasing creations within society as a whole. Thus the argument states that copyright provides the greatest utility for the greatest number of people especially when compared to a situation with no copyright. This is where the thesis research contributes to the realm of the copyright discussion. The research focuses on the influence of attribution or public information and economic rights or tournament pay on creative performance. Creativity tests are used to mimic the process of creation in the market for creative goods and with varying treatments, with and without, economic and attribution rights to measure their influence on creative performance. More specifically the focus is on the effects of tournament pay and public information on the creativity of the participants. The aim is thus to observe if the rights increase production and overall creative production as argued by copyright proponents.

2.3.4 Utilitarian Argument in Context of the Experiments

Given the results from the experiment conducted for the thesis it is possible to say if financial incentives do in fact increase creative performance or if they have any affect at all. In other words, if the results support the utilitarian rationale of copyright or not. It should be specified that using the results no judgments can be made about the legitimacy of copyright but rather about the utilitarian argument used to rationalise it. Whether creativity or the subjective success of the participants is, or is not, affected by the tournament

pay or public information is discussed in terms of the utilitarian argument for copyright. The newest extension of copyright in the US, named the the Sonny Bono Act[8], has been theorised to have a negligible impact on incentives and the creation of new works. This is based on the small increase it would have on the present value of any new works and thus could actually decrease the total amount of works in the public domain (Akerlof et al., 2002). The term extension was not found to increase the incentive to create new works either, even when considering the effect of optimism bias (Tor and Oliar, 2002). The results from the experiment can inform not only the discussion about the effectiveness of the utilitarian argument but also the discussion about the optimal term of copyright.

2.3.5 Rationale and Copyright

The utilitarian argument is often used to justify the existence of copyright. For example, when both the stationers and the publishers lobbied for the Statute of Anne, basing the need for copyright on an underlying assumption that monetary rewards incentivise creation (Feather, 1994, p. 4; Rose, 1993, p. 48). There is some doubt that this is the case however since there seems to be a distinct lack of empirical evidence that the monetary incentives brought on by copyright law spur creation (Atiq, 2013; Boldrin and Levine, 2013; Howe and Griffiths, 2013; O'Hare, 1982). In fact, there is evidence that monetary incentives, similar to the incentives brought on by copyright, can crowd out already existing motivation and causes a decrease in overall creative performance (Amabile and Pillemer, 2012; Atiq, 2013; Deci, 1971; Deci, 1972).

Copyright is also subpar when it comes to allocating earnings among creators. It is not the stated purpose of copyright according to the utilitarian rationale, but it does bring up the question if copyright is necessary, because it's found to widen the gap between superstars and other artists (Kretschmer, 2012). This is relevant because the monopoly that copyright awards over a work causes market distortions that cause copyright as a solution to piracy, to be a second-best solution. Especially in the digital age where it affects user privacy and ability to browse the internet freely (Palmer, 1990; Towse, Handke, and Stepan, 2008; Zimmerman, 2002). Term extensions of copyright point to it being more of a mechanism of rent collection for copyright holders rather than a tool to incentivise creators, since it was a retroactively extended copyright (Tor and Oliar, 2002). There is also doubt as to the necessity of a copyright regime as it is not the only way to promote creation, depending on what the industry is, there are numerous alternatives to copyright which would not carry the same market distortions (Atiq, 2013; Gallini and Scotchmer, 2002; Palmer, 1988; Stiglitz, 2008). There are additional legal alternative which could

[8] increased the copyright term of copyright protection by 20 years(Akerlof et al., 2002)

be more effective in protecting copyrightable works without carrying many of the transaction costs of the current system (Atiq, 2013; Boldrin and Levine, 2006; Palmer, 1990). Considering a copyright or IP regime is judged by the ease of transactions and the way it strikes a balance between incentives and access, any unnecessary increases in roadblocks to rights exchanges, such as transaction costs, would not be a desirable externality (Landes and Posner, 1989; Towse, Handke, and Stepan, 2008). If there is more information about what promotes creation then steps can be taken toward a more effective copyright regime. This is where the results in the later chapters can shine more light on what incentivises creation and so allow for a better idea of how policy could be structured to help spur creation.

It is important to be aware of the copyright systems strengths because in certain situations it can be the most efficient system, like when the cost and value of a project are not observable by the sponsor (Gallini and Scotchmer, 2002; O'Hare, 1982). There are also ways to make the current copyright system more efficient which would only require relatively small adjustments like forming a registry for copyrighted works which would decrease the tracing costs for creators (Landes and Posner, 1989). Copyright is not optimal and is an example of a second best solution (Towse, Handke, and Stepan, 2008, p. 12). This does not mean that copyright is not necessary or that it's an inefficient way to incentivise or protect creators' products, it could be the best system available, at least in some cases. However, it is necessary to look closer at the rationale used to justify it, because if this rationale is found to be incorrect then the foundation on which copyright has been created is weak. This can cause copyright to address the issues of incentives and property protection in the copyright industries in a way which might not be efficient, possibly even fixing a problem which does not exist. Causing externalities brought on by monopoly power and transaction costs. The argument behind the justification for copyright is crucial to fully understand it and to fix any potential inefficiencies/problems brought on by it, if they are to be addressed appropriately. If researchers can get closer to answering the question of what incentivises creation, then it becomes easier to create a legal environment based on the findings that can be more efficient than simply going by past legal precedent.

2.3.6 Copyright Globally: Berne & TRIPS

To round up the discussion about copyright, the origins of global copyright is discussed which will help to give perspective on the global influence of copyright. In terms of international copyright, one must start the discussion with the Berne Convention, which was signed in 1886 with the original signatories being exclusively from Europe (Story, 2003;

WIPO, 2013). The first signatories were developed countries, but gradually more developing countries joined due to the colonial clause (Malkawi, 2013). There is a clear colonial influence when it comes to IP protection since there is a positive correlation between IP protection and colonial history (Peukert, 2012). The Berne convention was influenced by the French droit d'auteur or authors rights which contrasts with common law countries like the US where copyright deals with economic concerns (Malkawi, 2013).

In civil law countries copyright is concerned with authors rights while in common law countries it is used in a broader sense extending to related rights where the rights are not connected to the author (Sterling, 2000, p. 14). It took until 1988 for the US join the Berne, but quickly evolved into TRIPs[9] and this included most substantial provisions of the Berne Convention but left out moral rights due to US fears of inadequate moral rights protection (Malkawi, 2013, p. 21;Sterling, 2000, p. 78). Thus, it's safe to say that the Berne Convention has had a large influence on modern global copyright especially with Berne serving as the conceptual framework for treaties like the WIPO[10] (Story, 2003, p. 21; Sterling, 2000, p. 78).

It is important to understand the historical context of the law to fully understand the differences in motives for copyright in the developed and developing countries and effects of global copyright on the developing world. The developed world has an incentive for strong copyright to protect their works abroad while in the developing world it would be more advantageous to have more relaxed IP laws (Malkawi, 2013; Shi, 2010; Story, 2003). Historically speaking developing countries have sought lower IP protection because they might impede economic development (Malkawi, 2013). This claim has some support as some developing countries have substantial difficulties providing affordable education due to inflexible international copyright laws which cause the educational materials to be prohibitively expensive for educational institutions to purchase (Story, 2003). It is interesting, as a case study, to note that when the US was in its development stage in the 19th century it didn't give copyright protection to foreign works (Plant, 1934).

However, developing countries no longer have the same freedom to resist international agreements like TRIPs as developed countries have the power to coerce developing countries to sign by threatening to pull foreign aid (Braithwaite and Drahos, 2000, p. 215). This is done because TRIPs mainly benefit industrialised countries with harmonisation lacking flexibility for developing countries which find long term benefits from TRIPs illusive (Shi, 2010). Traditionally monopoly rights associated with copyright, which are granted by international trade agreements, are mostly used as method to extract revenue

[9]TRIPs or the agreement on Trade Related Aspects of Intellectual Property Rights. It is signed by all WTO members (wto.org).

[10]The WIPO being the World Intellectual Property Organisation tasked with encouraging creativity and protecting intellectual property globally.

from the developing countries (Boldrin and Levine, 2006). In light of this information it should be no surprise that copyright industries use substantial sums of money to lobby the WTO and WIPO (Towse, Handke, and Stepan, 2008). This is why there have even been calls to abolish the Berne convention completely as it promotes inequality between developing and developed countries that use the agreement to protect their intellectual property at the expense of development in, for example, Africa (Story, 2003).

It is also argued that neither TRIPs nor Berne offer adequate protection and that although copyright might be an unfair competition law, it should be strengthened as it would be more efficient than an alternative IP law paradigm (Lehmann, 1994). The problems caused by inflexibility of provisions and the abuse of power by developed countries could also be solved by decentralising power and deferring to national legislatures in order to balance protection against societal values (Helfer, 1998). It is worth noting copyrights global and local effects to fully understand the wide reaching implications of copyright and how it is important to have an effective global copyright system to create a globally conducive environment for innovation.

2.3.7 Copyright Arguments: Brief Introduction

Landes and Posner (1989) and Boldrin and Levine (2013) forward conflicting arguments regarding the effectiveness of copyright. Both pairs of authors have a series of papers that bring forward their theories on the role and effectiveness of copyright. Landes and Posner argue that without copyright there would be inefficient incentive for artists to create (Landes and Posner, 2003). They also state that the point of copyright is to maximise creating new works while minimising costs of limiting access and so the point of copyright is to balance access and incentive (Landes and Posner, 1989). In contrast to the point brought forward by Landes and Posner Boldrin and Levine argue against a copyright. Bouldrin and Levine argue that copyright increases rent seeking behaviour and that there is no convincing evidence that copyright increases innovation (Boldrin and Levine, 2013). The authors also argue that an incentive to create is best done through prizes or grants and that it would be best to eliminate copyright altogether (Bandura, 2006). These arguments help to frame the intended discussion in two sides of the debate, with one set of authors arguing for the effectiveness of copyright to the point of arguing for it to be indefinite. Compared to the other set who argue that the incentives to create are market incentives which copyright, if anything, is distorting and causes an overall decrease in creative production.

2.3.8 Efficiency v. Justice and Economic v. Legal Arguments

Copyright outcomes can be judged two broad themes efficiency and justice. The efficiency judgements focus on the efficiency of copyright outcomes while the justice judgements focus on the justice of copyright outcome. The efficiency discussion of copyright focuses on whether the benefits associated with copyright are higher or lower compared to the costs. A large part of the discourse associated with the efficiency argument is how the costs and benefits are measured and whether these measures are reliable. Ultimately the efficiency argument is closely associated with the economic arguments for copyright and the field of economics of law. This field has a large set of researchers who focus on quantifying/modelling costs and benefits as best as possible in order to make some judgment on efficiency. However these methods and conclusions can vary quite drastically as discussed in section 2.10 and 2.3.7.

Justice in reference to copyright is what is considered a just outcome for authors. The argument for moral rights is to some extent an example of the justice argument being used because it centres around the author having a personality right and it is just to protect this right in law. It can be viewed as just for the author to have some control of a work even after its sale because the work is a part of the author and their personality. This argument is not so much about what is efficient in a market context or in the context of an incentive and more to do with what is right or just. It serves justice for the author to have some control of what is ultimately viewed as an extension of the author or an extension of the self. The origin of this type of argument is closely tied to a Kantian view of the self and how a person and their rights can extend to their creations because a person's creation and personality or person is directly linked[11].

This is very different to a market approach where the value of a piece of work is dictated by the willingness of individuals to pay for it. Concepts like sentimental value are assumed to be captured by the willingness of the author to sell the work, as the higher the sentimental value of the work is, the higher the sale price will be. Efficiency would dictate the best outcome will be largely ordered by the market automatically as the buyer's willingness to buy and the seller's willingness to sell will already take into account any considerations of value, even sentimental value, of a work of art. The economic arguments around copyright very closely based on efficiency of the law which is dictated by the estimated costs versus benefits of copyright. Justice is more closely linked to the legal arguments surrounding copyright, and more closely with the moral rights arguments of copyright. However, it should be said that efficiency is not the only concept interesting to economists studying copyright and that justice is not the only concern in the legal arguments for copyright. There are arguments regarding just outcomes of copyright in

[11] Moral rights are discussed in more detail in section 2.3.1

economics and legal arguments citing the efficiency of the law but overall justice is closer to what the field of law view important in outcomes while efficiency is largely the concern of economists. The differences between the arguments in law and economics is discussed in more detail in section 2.10.

2.3.9 Patents, Copyright, and Industrial Organisation

The following is a short discussion regarding the differences between copyright and patents and its influence on the general organisation and dynamics of the industries under the two IP regimes. These differences are argued to be large enough to require different experiment structures for both which is why the experiment structure introduced in chapter 3 is more relevant to the field of copyright. The experiments also discuss the effect of reputation on creativity and its potential influence on innovation more generally. Thus, some points regarding reputation discussed in the results in chapters 4 and 5 can be relevant to both IP regimes even though the market dynamics of the stylised market are more relevant to copyright industries.

Copyright and patent law can fall into the category of industrial organisation literature because both types of IP law influence market mechanics and the efficiency of market dynamics. However, the two have differences in the way they protect intellectual property and influence the market. Copyright is instantly granted without the need for an application process and grants a copyright, or a monopoly on the expression, for the life of the author plus 70 years (ws for a maximum period of protection of 20 years (*Copyright, Designs and Patents Act* 1988). Patent mean while is not automatic and the inventors of the patent need to apply for the patent by showing non-obvious improvements on existing patented inventions and only allows for a maximum period of protection of 20 years (*Patents Act 1977*). These few aspects of patent and copyright law already highlight the major differences in the two IP laws. Patents require proof of originality and requires the patent to be made public once a patent is granted (*Patents Act 1977*). This is in stark contrast to copyright law where as soon as a work is created there is an automatic copyright (*Copyright, Designs and Patents Act* 1988). Excluding other differences in the laws between patents and copyright the process of gaining the two IP protection already differs in such a way that it affects the market dynamics. Firms can use trade secrets instead of using patents in order to protect their intellectual property which allows them to keep their creations secret (Acemoglu, 2009, p. 521). This type of decision on the part of the IP creator is not as necessary in the copyright fields as there is automatic protection of works[12]. When

[12]Even though an aithor under copyright protection might still want to keep the work secret but does not face the same type of choice as under patent protection. This is partly due to the long term of copyright protection.

focusing on the creation process this difference makes a large impact on the way a lab experiment on the subject of patents would be set up which is why the experiments detailed in this thesis focus on copyright law and are not necessarily as directly applicable to the patent market. The decision to keep secret or to apply for a patent is a complicated decision to model where as an automatic copyright or IP law is simpler to recreate in a stylised market. Which is why, although the results can to some extent be relevant for the study of IP creation more generally, it is more relevant in the context of copyright law.

Acemoglu also points out that along with trade secrets, industry specific innovation also makes the innovation excludable as patents would in a market where innovations are more widely applicable (Acemoglu, 2009, p. 548). Interestingly he points out that the market size is a crucial factor in explaining the prevalence of innovation in an industry. Referring to studies by Newell, Jaffe, and Stavins (1999) on the effectiveness of market incentives on innovation in the air conditioner industry, Popp (2002) on the influence of energy prices on innovation in the field of energy efficiency, and Acemoglu and Linn (2004) on the effect of increases in market size and the vaccine creation (Acemoglu, 2009, p. 543-545). This is in interesting contrast to recent work by Christian Handke on the recent innovation in the music industry where, even though the size of the market was decreasing in monetary terms, there was no decrease in the overall number of works being created. This is an interesting finding although he does consider this effect could be due to the significant decreases in the marginal costs of production in the industry (Handke, 2010). However, one key difference of copyright fields compared to patent fields is the theorised need for self-expression as discussed by Hans Abbing which might not be as strong of an influence in patent industries. He argued that artists are a very different type of person where they feel a strong need to express themselves even when there is a very large income penalty compared to other existing work. Although the willingness to participate in an industry with a large income penalty was at least partly attributed to (over)confidence in their own ability and not just the need to express ones self[13] (Abbing, 2011, p. 113-119).

Patent fields have a prevalence of patent assertion entities "PAE's" also referred to as patent trolls. These entities do not use the patents themselves but rather make their money by licencing their IP (Kiebzak, Rafert, and Tucker, 2015; Orsatti and Sterzi, 2018). Once a PAE has acquired a patent it has been found to decrease the amount of citations the patent receives. This happens because once a PAE acquires a patent innovative firms reduce their activity in the fields where these patents have been acquired (Orsatti and

[13]There could be a need to invent in patent fields as there is a need express ones self in copyright fields. However I am not aware of such theories in the patent markets.

Sterzi, 2018). With copyright it is also possible to acquire IP and create copyright catalogues, as record companies generally do. Although there is generally less possibility to limit a competitors ability create in copyright fields compared to patent fields where it can be more difficult to work around existing IP. It is worth noting that in copyright industries it is often the case that there are large fixed costs but low marginal costs, take films or music as an example, however in patent industries there can be high variable costs of producing the products which patents are protecting. Take cell phone production as an example. Not only does the production process require multiple patents or licences to create the phone with multiple individual parts but the procurement of materials and production of parts can be very costly. Although making a movie can require licencing of IP similar to the process of cell phones, once the production is done it can be copied at an effectively 0 marginal cost. This is another key difference between the markets in the two IP regimes as there is generally lower marginal costs of production in copyright industries compared to patent industries. Higher variable costs of the products add another layer of complexity to the competitive market which would need to be considered in order to more accurately mimic patent markets. This is not to say that the experiment discussed in chapter 3 does not have any relevance to the patent industry as there are similarities. For example, computer programming operates using both in the patent and copyright to their advantage (DiCola, 2013). However, there is a clear focus on the influence of financial and public information/reputation effects in the copyright industry.

2.4 Market Structure in Creative Industries

The previous section discussed some impacts of attribution on the sales decisions of artists and helped to gain some insight into how there might be some disparity between willingness to pay and accept between offers to buy a piece of art. This suggested that there is some value in attribution which was not completely explained by the endowment effect. The next area of interest is then the pay structure of these markets and how these can influence production decisions. The pay structure found in many copyright industries is similar to a tournament pay structure where a large proportion of all the earnings in the industry are concentrated at the top, with examples being found from book and music publishing (Kretschmer, 2012; Kretschmer and Hardwick, 2007; Abbing, 2011, p 193). This creates unique incentives compared to a system of fixed pay where there is no or little difference in pay between individuals. This introduces a race to the top where multiple individuals compete for the very high rewards at the top while taking the risk of being at the bottom end of the earnings spectrum.

2.4.1 Patents, Copyright, and Intellectual Property

There is the same conflict between protection and allowing follow-on innovation at the foundation of patent and copyright law. In copyright law there is the conflict between the allowing individuals a copyright and the negative influences that copyright might have on the ability to create derivative works[14]. The problem is that both copyright and patents allow the holder a monopoly over their creation which can hinder further innovation, especially as this could decrease the monopoly power of the patent or copyright holder. It is even argued that allowing patents for airplanes in the early stages of its development actually slowed down the speed of aviation innovation in the US (Boldrin and Levine, 2013). There is also the problem of patent assertion entities (PAE's) also called patent trolls which are entities which own patents but do not produce goods based on them. Rather they make money through licensing their patents or by suing individuals or companies who violate their patents. They have been found to cause decreases in innovation and venture capital investment in fields which they operate (Orsatti and Sterzi, 2018; Kiebzak, Rafert, and Tucker, 2015). This indicates that the patents which are designed to increase innovative behaviour can have the exact opposite effect. These types of entities are less likely to exist in copyright although there are some analogs in the copyright industries where larger firms and entities with large catalogues sue artists which are seen to copy existing works. However the mechanics of these two phenomena are different. Crucially patents have a lifespan of 20 years while copyrights have a life span of the authors life plus 70 years (*Copyright, Designs and Patents Act* 1988). This is, at least partly, due to the relative cost of the monopoly which is granted in the two circumstances. Patents are also used in fields which evolve relatively quickly such as, the aviation industry as detailed previously. Thus long terms ownership of such as, the terms in copyright, would not be

2.4.2 Effects of Pay for Performance

To gain background knowledge of the effectiveness of pay as a motivator, performance related pay and its effects on productivity is discussed before moving onto how pay and performance related pay affects creativity specifically. Performance related pay is an important topic for businesses and policy makers who aim to maximise overall productivity. There is vast amount of literature about the effects of performance related pay in general (Deci, 1971; Frey and Oberholzer-Gee, 1997) and in a business setting (Amabile and Pillemer, 2012; Amabile, 1997; Suff, Reilly, and Cox, 2007). Business performance related pay

[14]Works which are largely based on an existing work. The derivative work can be so similar or based so directly on the original work that the author of the derivative work would need the permission of the copyright/patent holder in order to publish/sell the new/derivative creation.

(PRP) literature is reviewed in context of how it might affect performance in varying contexts.

Performance related pay, without considering its potential interaction effects with reputation, has a large literature in business organisation, psychology and economics. There are two concepts of interest related to PRP: crowding out and sorting. Crowding out can occur when extrinsic motivators, such as, minimum performance requirements or performance related pay are used to motivate individuals. These are then said to crowd-out intrinsic motivation which arises from, for example, task enjoyment (Deci, 1971). Sorting, on the other hand, is when performance related pay causes the less productive workers to quit or produce low effort while attracting and motivating highly skilled labour (Eriksson et al., 2007). These two effects help to explain how, in some cases, conventional wisdom of "the more incentive the better" works, while sometimes PRP and other extrinsic incentives can decrease overall performance.

Sorting is an interesting phenomenon as it explains well a key insight about PRP's affect on motivation. Individuals act strategically and react to the incentives of their environment. Thus, when articles, such as, (Eriksson et al., 2007) or (Lazear, 2000) mention the sorting effects due to PRP, it highlights a core question: who do you want to motivate? Is it the talented who can then be pushed to increase their overall production and produce something masterful, or is it that the best situation would be best would be when overall production is at its highest? It is also crucial to note the impacts of PRP on the work environment or industry as PRP has been found to widen wage gaps and create conflicts which can be detrimental to team effort (Lazear, 2000). In addition, the overall impact of PRP can be offset by the sorting effect which would render the PRP's pointless, although organisational commitment seems to negate some of the demotivational aspects of PRP (Marsden, French, and Kobi, 2000). This is echoed in business literature it suggests that that external incentives are administered does matter i.e. whether they are prosocial and increase production or controlling and decrease creative production (Amabile and Pillemer, 2012). The research thus attempts to answer how individuals perceive the two rights and how do they affect performance? Do we observe a higher variance and a sorting effect? Or is there overall increase in production which would hint to the rights being perceived as prosocial motivators.

Crowding out and sorting are very similar effects since the sorting effect has the intrinsic motivation of the lower performers is crowded out while seemingly supporting it for the higher performing groups. It can thus be theorised that how people perceive themselves matters when observing PRP as if people think they are in the top group in talent they will increase their total production, but this might not work after feedback about the individual's relative performance has been received. This could be a contributing factor

as to why PRP is less frequently found in long term employment relationships (Lazear, 2000). It is thus interesting to note how performance or tournament pay and attribution rights might affect performance in the long term, although it is out of the scope of the current study some general comments are made on the issue.

The Structure of the Creative Markets

Observing the structure of the market for creative goods it is possible to gain insights into the environment where most art is created, and although the different fields within the creative markets are different there are many overarching similarities which are worth going into in more detail. Taking book and music publishing as an example they have been found to be markets where the average pay is considerably lower when comparing to other industries and where the median pay is far below the average (Kretschmer, 2012; Kretschmer and Hardwick, 2007). The same skewness of income due to the concentrated earnings for performers is argued to be the case for artists in general (Abbing, 2011, p. 113). This income penalty for artists in general is thought to be the case due to an oversupply of creative goods which would make the market structure imperfectly monopolistically competitive (Menger, 2001).

It is common for artists to hold jobs outside of the market for creative goods to the point that a significant proportion of the artists income comes from these sources (Alper and Wassall, 2006, p. 825, 829; Kretschmer and Hardwick, 2007; Throsby, 1994). In fact in some industries such as music the proportion of income from these sources are very low (DiCola, 2013). Suggesting that artists in the market are either participating in the market as a hobby or funding their artistic endeavours by finding outside sources of income. The former claim is supported by findings that artists have a positive cross price elasticity between non-arts income and spending on the artistic endeavour (Towse, 2006). Thus artists are willing to accept the low pay of the career, at least in the short run, and rely on their income from outside sources but when this income from outside sources increases the artist increases their time/money spent on their art. Outside income acts as a subsidy and increases the overall supply of goods in the market diluting the demand base and decreasing average earnings. The 'oversupply' has any consequences on the quality of the artistic product necessarily. In winner-takes-all markets the important factor in market success is relative performance and a limited attention, memory, and overall mental shelf space of the consumer further skews demand toward the successful producers (Frank and Cook, 1996).

This market structure is important to take into account when discussing incentivising creativity because, for a subset of people, financial incentives might only incentivise one type of production over another. Furthermore, the initial motivation for being in

the creative industry is important as financial incentives, such as copyright, can cause people to keep out of the market. Artists are thought to create for a variety of reasons, fame, wealth, or self-expression with the joy of creation cited as important (Cowen and Grier, 1996). Artists are generally thought to be more intrinsically motivated and create as a selfless act (Abbing, 2011, p. 81-82). Taking this into account analysing the impact of economic incentives becomes more imperative because there is a possibility that one motivator could crowd out the other. Economic rights or the ownership of a good can also discourage further innovation or creation in the fear of possibly violating anothers intellectual property as discussed earlier.

If creativity is increased in the market how might this affect the market, and is this even interesting or important? In pure monetary terms quality of the creative product the value of the product corresponds to the quality of the art (Frey and Pommerehne, 1989). If this is the case then an overall increase in the quality of the product in the creative markets would increase the value of those markets. However the increase in market value is not the only component of interest when discussing any market or even economy as a whole. This is similar to discussing real GDP growth for an economy since the growth of the real GDP does not mean an increase in the overall living standards of the market participants. The key to fully understanding the effects of an increase in value, whether it be real GDP or market value, is how this increase is distributed in the market. For creative products this increase in market value can be very lucrative but if the increase in incomes is concentrated at the top of the distribution then the benefits of this type of increase in market value can be limited. Although a boost in revenue, through interventions such as copyright, can increase the value at the top of the income distribution and so increase incentives for creators at the bottom of this distribution to work hard to get to the top (DiCola, 2013). However the question remains, is the increase in market value and incentive, increasing living standards, producer welfare, or even welfare overall?

Winner takes all or a tournament pay structure can be an efficient way to encourage effort in fields where it is hard or expensive to observe output but easy to observe workers rank or relative performance (Lazear and Rosen, 1981). This is especially relevant for markets for creative goods where it is easy to observe output, but can be hard to quantify or accurately predict its value, as evidenced by the 'no-one-knows' principle. Considering this it might not be a surprise that creative markets tend to be winner takes all markets, i.e. markets where earnings are highly concentrated at the top. The central tension in such pay schemes is the trade-off between encouraging effort on the part of the worker or market participant and balancing the burden of risk which makes winner takes all markets fairly unattractive (Krishna and Morgan, 1998). This is also important as copyright allows artists to recover their fixed costs more easily compared to a market environment

where there would be no such rights (Towse, 2014). This reduces the risk to the creator and thus would facilitate creative production, which is the essential part of the utilitarian argument.

2.5 Directly Related Copyright Studies

A recent 2014 study empirically tests how different thresholds, like the ones for patents and copyrights affect the creative performance of subjects in an experiment where the test subjects completed different creativity tasks under varying threshold conditions. The aim of the study being to see how these different threshold levels incentivised creativity and so conclusions could be drawn on whether these threshold conditions spurred creativity or not. What the researchers found was that there was little difference between the control group and the low threshold condition designed to mimic copyrights legal threshold for creativity. They found that performance increased significantly between the copyright and patent conditions, where the threshold was significantly higher compared to the copyright condition, concluding that if sufficiently strong thresholds and monetary incentives tied to them do incentivise creativity (Buccafusco et al., 2014). What this means is that monetary incentives are more effective the harder it would be to gain a copyright or the higher the creative standards in to gain economic ownership of an idea. This finding in the context of copyright markets would suggest that whatever the market was looking for, in terms of style or quality for example, would be delivered with the higher quality the higher the thresholds for success were. If we take these results as given the question remains is the market producing what it socially optimal and are the incentives that are in place promoting creativity and socially optimal production? It also implies that if the market were to demand higher quality goods then this would create an incentive to increase creativity or the product/output which would support the utilitarian rationale.

This thesis adds to the previously mentioned research by taking into account the attribution or public information aspect in creation. How does the fact that a person can indicate themselves as the creator of an expression influence the way participants interact in the market place? There are interesting studies related to the effect of attribution rights on the price of art works and the cognitive biases involved in selling one's art works which affect the efficiency of the art market. These studies find that there is a significant difference between what people are willing to buy an artwork for and what people are willing to sell an artwork for, which suggest there is personal value to the work apart form an endowment effect (Buccafusco and Sprigman, 2010; Sprigman, Buccafusco, and Burns, 2013). Similar studies support the findings of an endowment effect that exist due to some default rules, of which attribution could be one (Marcin and Nicklisch, 2014). Thus there

is an endowment effect which is found more generally[15] but there is also a part of Studies such as these help map the cognitive biases involved in valuing one's work and could go a way to explain why the art market can be inefficient at times, even without taking into account the effects of copyright. It can also help explain how people overestimate the value of their work or their chance to succeed and this could increase incentive to create even without monetary rewards (Buccafusco and Sprigman, 2010). The research in this thesis on public information and tournament pay, along with the existing research on cognitive biases involved in the creation and pricing of art, can help shed light on what drives creation and if copyright laws incentivise it. The interaction between attribution/public information and economic rights/tournament pay as an extrinsic reward can help to further inform the discussion on the impact of incentives and their influence on creativity.

2.6 Fairness and Satisfaction Literature and Utility

Along with the creativity implications of aspects of copyright, the thesis discusses how the individual perceives the differing market environments. How do the market participants perceive the fairness of the market rewards? Does the satisfaction in one's performance depend on the market environment? Is there evidence of differing levels of enjoyment or envy which is present in differing market environments? What are the consequences of these market environments on perceived or experienced utility? The following discussion will briefly introduce these concepts and discuss previous research on the subjects. Chapter 5 discussed these questions using the results from the post-experiment survey to gain some insights into how individual's perceptions can depend on the market environment.

2.6.1 Satisfaction

According to the oxford dictionaries satisfaction is "Fulfilment of one's wishes, expectations, or needs, or the pleasure derived from this.". It is important to note that there is an explicit reference to expectation, and the fulfilment of one's expectations. This is especially important when discussing the relation of satisfaction to utility. Satisfaction is defined as the difference between the experienced utility of an outcome and the expected utility of an outcome (Kahneman, Wakker, and Sarin, 1996). This means there is also the distinct possibility of there being negative satisfaction or dissatisfaction if the expected

[15] Kahneman, Knetsch, and Thaler (2010) is an example of a paper where this is discussed in a general context.

utility is higher than the experienced utility. This is also important in terms of the frame individuals will perceive the market it. It is already known that framing of a question or situation has a significant influence on how people perceive them and what decisions they would make (Tversky and Kahneman, 1986). In addition, if one's work is perceived as interesting and challenging it can increase job satisfaction, but it is not then high performance with low satisfaction is possible (Ramser, 1972). Thus, the way individuals perceive the market can have very real effects on their perceived satisfaction.

So what consequences might satisfaction have? Satisfaction has been found to have a partial mediating role in the relationship between effort and turnover (Devonish, 2018). Furthermore, job satisfaction has been found to indicate turnover intention (Eidukaite, 2016) and findings suggest there is a relation between satisfaction and retention of labour (Mitchell and Albright, 1972). In turn, turnover can influence job culture negatively (Posada, Martín-Sierra, and Perez, 2017). This indicates a strong relationship between job satisfaction and the long-term job environment and even productivity in an organisation, as turnover can cost companies due to the training costs in money and time[16]. Interestingly performance and satisfaction have also been found to strongly correlate where job performance has been found to dictate job satisfaction (Judge and Thoresen, 2001; Christen, Iyer, and Soberman, 2006; Ramser, 1972). In addition, pay rank or how much one is paid compared to coworkers has been found to influence satisfaction (Card et al., 2010). This brings up the possibility the same will be the case in the experiment conducted in this thesis. It is also interesting to observe how the varying market environments influence job satisfaction and how the conditions on tournament pay and public information interact and influence perceived satisfaction.

2.6.2 Fairness

Fairness and satisfaction have a strong relationship with each other. Price fairness has been found to influence satisfaction (Herrmann et al., 2007). Fairness perceptions regarding a service have also been found to dictate satisfaction in the service (Sindhav et al., 2006). Hence, there is strong evidence of fairness and satisfaction being connected concepts where fairness perceptions have a strong influence on satisfaction. This is strong evidence that satisfaction can be relative due to the fact that fairness influences satisfaction and itself has a strong aspect of relativism to it. In addition, uncertainty has been found to moderate the effect of fairness on satisfaction (Diekmann, Barsness, and Sondak,

[16]The above studies are specifically on job satisfaction and chapter 5 focuses on the performance satisfaction, as they are not in a job and so job satisfaction would not be an appropriate measure. However, there is strong evidence that the results in chapter 5 strongly correlate with existing evidence on the relationship between job satisfaction and performance.

2004). This brings up interesting questions about how individuals will perceive fairness in the stylised market for creative goo present in the experiment.

Distributive fairness perceptions are also found to influence satisfaction as the manner in which rewards are distributed matters (Lau, Wong, and Eggleton, 2008; Perista and Quintal, 2010). These findings suggest that if satisfaction levels are to be constant throughout treatment groups, then there is possibility that individuals in the market view the market mechanism as a fair way to distribute rewards. However, this is likely not the case based on the research regarding performance pay cited earlier. This perception of fairness has been found to largely depend on whether individuals perceive rewards are due to hard work or luck, where a distribution is found to be fair if it is due to hard work and unfair if a reward is found to be due to luck (Alesina and Angeletos, 2005). This is an important mechanism that dictates the fairness perceptions especially in the context of the research as the "nobody knows" principle is likely not only to cause some uncertainty but also make it hard to observe if success and rewards are due to luck or hard work.

2.6.3 Envy and Fun

The role of envy and fun as measurements in the study are largely to support findings of fairness and satisfaction and to get a more informed idea of how the different treatment groups influenced perceptions of fairness and satisfaction. The measure of envy for example was the willingness to trade places with an individual given that they would have to put in the same effort as the person they are trading places with. This measure is based on the idea of envy free and is able to gauge is individuals felt that the success of others was due to luck or a difference in effort. This is because if an individual states they are willing to trade they are effectively stating that the difference in outcome or pay is, at least in part, due to luck.

Fun as a measure is in order to see how satisfaction and fairness perceptions influence the perceived fun or enjoyment in the treatment groups. If there are strong correlations then there are is evidence that the concepts are closely linked which would make the utility discussion regarding the market straight forward in terms of the three concepts. However if there is deviation it would point to satisfaction, fairness, and enjoyment being, to some degree, separate concepts which are derived from different sources. That is to say if satisfaction is low but the individual reported to have fun then there is some evidence of the possibility of varying expectations or differences in the expected success which in turn can enlighten the discussion regarding the influence of the market for creative good on individuals.

2.6.4 Relevance to Markets for Creative Goods

What does any of this have to do with markets for creative goods and incentives within this market? A large part of markets is not only consumer welfare but prodcer or worker welfare. Often when we speak of producers we think of companies and workers as the individuals working within the companies and these workers are entitled to some welfare as a basic human right. The same applies in the markets for creative goods as the workers can be considered the artists who have contracts at record companies, or publishers. However, the markets for creative goods are unique in the sense that they have much more potential for freelance work where individuals are their own boss and can partner up with entities that offer the best business or personal relationships. This is, at least to some extent, discussed by Klamer and Petrova (2007) where they outline three main ways or spheres of financing the arts along with their consequences. The three spheres of finance were the government, markets, and what they called the third sphere which consists of voluntary support from individuals and corporations where the contribution is no strings attached and based on generosity and the trust that the artists use the money to further their art. The third sphere is not completely unlike the patronage system in the sense that it would be private individuals but the difference would be that the 'patron' in this case would not commission works or attempt to influence the work of the artists. This can be found, at least to some extent, in sites such as Patrion or GoFundMe although it can be argued these are more to do with the market demand than the third sphere and the values of generosity or trust.

The key here is that when variables, such as, economic rights/tournament pay or attribution rights/public information they have an effect on how the individuals view the market. This is interesting especially in context of previous research about motivating creativity where the way individuals perceived the motivator influenced its effectiveness.

The purpose of the first half of the chapter is to set up the discussion for the method chapters to have a solid foundation of understanding of the issues being addressed by the experiments. The key is to understand the importance of the market structure of the market for creative goods and how copyright was designed to work in these circumstances. The history of copyright helped to inform the justifications for it, both in the common law countries and globally, which in turn helps to place the motives highlighted by copyright in context of more traditional economic market analysis. Thus steps have been taken in order to discuss copyright in terms of public information and tournament pay rather than attribution and economic rights. This is done to be more precise with what type of motivators are present in the stylised market present in the experiments, rather speaking about copyright more generally. Thus, some concessions of realism have been made in order to be more precise about the motivators being discussed. This does not make the

results from the experiment irrelevant to copyright law but rather helps to narrow down the variables of interest into two main areas, information and pay structure, which are influenced by copyright.

2.7 Introduction to Interdisciplinary Research

Interdisciplinary research can be defined as the combination distinctive components from two or more disciplines where there is the possibility of levels of interdisciplinary depending on how different the combined research areas are viewed as (Nissani, 1995). This section will focus on the relationship between economics and psychology and the way each discipline uses experiments in their research. The aims is to discuss the intricacies of experiments as a research method and the advantages and challenges of using experiments effectively in interdisciplinary research. The end of the section focuses on the intersection between law and economics. The focus will be on the philosophy behind law and how it is reconciled with the philosophy and methods and economics. There is no separate discussion for experimental methods used in law research as the experimental method is used very sparsely in the law and only recently has it gained traction. Experimental research in law is discussed in the method section when referring to similar studies which exist in law research.

Given these definitions, why are experiments a useful tool for Interdisciplinary Research? To gain more insight into the discussion of experimental economics as a methodology for interdisciplinary research, it is worth going into detail about the scientific method more closely and how specifically scientific knowledge is created or can be accumulated. Specifically how economic and psychology experiments can be utilised in this context to gain insights into the effectiveness of laws. Falsification, as advanced by Karl Popper, is a concept where scientific knowledge can be forwarded by creating a falsifiable statement which can then be falsified or there can be an attempt to falsify it. This is important as it also states that a scientific theory or statement only needs to be proven false and not proven true, that is to say if it is proven false it can be regarded as an incorrect statement and discarded from scientific knowledge (Popper, 1992, p 32-42). This is important in the context of experiments as they can then be used to test scientific theories through the process of falsification. For example, if there is a theory that states that if A then B in all cases and there is experimental evidence which suggest A does not equal, then to state that A equals B in all cases has been proven to be false and so may be incomplete or need modification. Thus experiments are a useful tool to test the strength of economic theories, although there are caveat's to this statement.

Economics has been seen as a subject area which has a lack of controlled and repeated lab experiments (Davis, Hands, and Mäki, 1998) and this is especially true for copyright where there is a more general lack of empirical evidence (Atiq, 2013). Although this statement is not as true for economics, especially as behavioural economics is becoming more popular, in the field of copyright there remains a the need for further empirical evidence. There exists many ways how empirical evidence could be gathered and so experimental evidence is by no means the only way. Especially when a growing literature exists in the field of copyright research where empirical evidence is gathered from sources ranging from using publishing data to predict the value of the public domain (Erickson et al., 2015) and photos on Wikipedia (Heald, 2014). It is also collected from surveys on authors earnings (Kretschmer, 2012; Kretschmer and Hardwick, 2007). In addition, there are studies on the impact of copyright penalties on file-sharing (Maffioletti and Ramello, 2008) the impact of file-sharing on music sales, supply, and the incentives to produce music (Oberholzer-Gee and Strumpf, 2007) and the cultural effects of file-sharing (Huygen et al., 2009).

There is a push within the subject area of copyright to focus on increasing the amount of empirical evidence on the subject. With this push, experimental methods have been used to test for effect of copyright thresholds on creativity (Buccafusco et al., 2014) and the impact of attribution on willingness to accept and the pricing of art (Sprigman, Buccafusco, and Burns, 2013; Marcin and Nicklisch, 2014). There is clear value in applying experimental methods in the field, but it is important to understand the method before we know why this is the case. Experiments can provide a middle ground between the theoretical and the empirical reality where researchers can test alternative theories that may not be possible using naturally occurring data (Croson, 2002). This is because reality can be too complex unless some simplifying abstractions are made in order to study variables and their effects in isolation (Machlup, 1978). Using for example investment data, it can be difficult to deduce what the effect of some new information might be on a price of a stock as the information can be important in determining the price of some other stock which then might affect the price of the original stock in question. This is a hypothetical situation but non-the-less describes a very real issue possible issue with using "real world" data compared to experimental data. This is obviously not to say that there is no use in using real world data, quite the contrary, the external validity of real world empirical data is very high and it can and should be used to inform policy decisions. However the strength of experimental economics is the ability to single out effects and thus it is easier to observe the relationship between specific variables in a more controlled environment of the experiment.

An especially fruitful subject area in regards to experimental/lab research is the study

of risk and uncertainty. Here experiments and surveys have been used very effectively to shed light on how individuals react to risk and uncertainty and how the frame or default is especially important when observing individual decision making. There exist a wide range of experiments from the willingness to pay for insurance to risk and uncertainty and the firm (Elliott, 1998). Probably the most well-known paper regarding the subject area is Prospect theory by Kahnemann and Traversky 1979. Strictly speaking it was survey based research and did not rely on interaction within the lab and so was not what people might traditionally think of as an experiment (Kahneman and Tversky, 1979). Non-the-less it the paper would greatly influence future experimental research. The paper used surveys in order to elicit information about individual preferences between risky and certain outcomes. Although not experimental economics, the paper served to show the importance of surveys in eliciting risk preferences by demonstrating the importance of frame on the risk preferences of individuals. The important point being that a gain of a given magnitude increases utility less than a loss of the same magnitude decreases utility. A later paper by the same authors uses surveys to show how the same problem, just framed differently, can have different answers depending on whether the situation was framed as a loss or a gain (Tversky and Kahneman, 1986). So much so that wording and framing of a question is important to consider when creating experiments (Boumans and Davis, 2015).

The influence of these papers did not stop at the theories they informed but extended to the way pre and post experimental surveys were presented to the participants. The research shows how framing of a question and the defaults that they set can affect the way a person answers questions that are mathematically identical. Taking into account research, such as, the previous it is clear that not only can experiments be exact in the way that information is elicited but they can provide into insights of human behaviour. This is especially pertinent when there is a lack of such evidence, thus an interdisciplinary approach can used to gain insights into previously unstudied phenomena/market conditions.

2.8 Cultural Economics

What is cultural economics? Cultural economics is the combination of economics and culture, even though they can be considered polar opposite concepts, the economic realities of the cultural industries are very real individuals operating within them (Towse and Khakee, 1992). An important discussion in the field of cultural economics is the difference between market valuations, dictated by prices of cultural good such as movie tickets or

art, and cultural or intrinsic valuations of culture and cultural goods. This topic is especially interesting when discussing what motivates individuals to make art or participate in the cultural industries since how individuals value this output can inform what might motivate individuals to produce it. Care is taken to separate the intrinsic value of a good and the market value of the good, or the value of the process of creation compared to the market value (Klamer and Petrova, 2007). This is especially important when differentiating between the culturalist[17] view from the economists view.

Cultural economics and cultural research in general is a wide field which spans areas of research, such as, archivists, the arts, law, cultural heritage, and economics. These fields have fundamentally different views on value and where value is derived. Value at its core is the worth to an individual or a groups of a good, service, or experience. In the cultural fields value can be defined in terms of shared customs, ways of life deriving from, for example practicing of the arts, while in economics value is defined by the economic consequences of actions which in are ultimately expressed in financial terms (Throsby, 2010, p. 17). Economics for example view the value of art as the market price, combining the value of all the processes of making a piece of art and boiling it down to the market price of the good. However it is also argued that this type of valuation ignores any value derived from the process of creating itself (Klamer, 2001). In some ways the value derived from art works, socially speaking, could be thought of as an externality of production which is not fully taken into account in the market price[18]. These externalities can include aspects, such as the importance of the work in the cultural heritage of a city or country, or its representation of a point in time which can be important in fields such as art history. These values are often not taken into account in the market price as the market price only reflects the personal valuation of the buyer and not the value to society as a whole.

The discussion regarding valuation of art is important when extended to the decision making process of artists to create art. If there is value derived from the process itself and not just from the economic outcome of the production, which way would be the best way to motivate production or to avoid disincentivising this type of production? Neoclassical economic assumption and regarding production of art may not hold if artists are oriented towards the intrinsic rewards of production then the traditional neoclassical rationality assumption of economics is inadequate to explain production decisions (Towse, 2010, p. 314-315). This is to say that the classical economic assumption of profit maximisation and strict rationality in decision making is not enough to explain what is the

[17] Culturalists focus on the study of culture but are not economists and so view value as a combination of intrinsic value and market value. This is compared to economists who focus on market value because in their view all value is expressed in the market value.

[18] The social benefit from the art work is higher than the private benefit/market value and so can be viewed as a positive externality.

driving force for creative production. If this is the case, a large proportion of the existing economic analysis on the influence of, for example, copyright law or market structures on the production of creative goods is lacking. The key to a more wholistic approach could thus be from the intrinsic aspect of the production process, which cultural economics and more specifically the culturalists can shine a light on. The economists viewpoint on issues of motivation is well documented and intrinsic motivation has been studied in psychology literature extensively starting around the 1970. One goal of this thesis is to discuss this intrinsic motivation in terms of its contribution to the discussion within cultural economics about motivating the production of art and culture. If intrinsic motivation is an important motive to produce art/cultural goods then policies to promote the production of cultural goods can gain from the focus of maintaining this intrinsic motive or even promoting it. This can be independent from or in addition to, focusing on external motives, such as, government funding of the arts or copyright law.

Artists operate in a winner-takes-all market where the large majority of artists earn below average wages (Abbing, 2011, p. 133; Kretschmer, 2012; Kretschmer and Hardwick, 2007). It is as if the artists have entered into a tournament where most of the value is concentrated at the top. This begs the question why do artists take art in this type of market willingly? Could the answer be that individuals are motivated by the potential for higher payoffs? This would be the traditional answer of an economists. In fact Levitt and Venkatesh found that the tournament pay structure in gangs dealing drugs is the same (Levitt and Venkatesh, 2000). The top of the pay structure motivates the individuals on the lower end to work harder even if they are making only around minimum wage in their current roles. This same argument is then extended into the cultural industries to explain how the market structure induce productivity. However traditional economics does not look into other sources of motivation, such as, intrinsic motivation or the motivation which is intrinsically present in the process of creation. This might not be very relevant when observing industries overall but can be convincingly argued to be the case in creative industries. This is exactly the milieu which cultural economics, and cultural studies more generally, operate in, and where non-monetary values are reconciled with the world of market prices derived from various market equilibriums.

2.8.1 Cultural Economics and Welfare

Cultural economics and the field of law and economics have many similarities that overlap quite considerably. One obvious crossover point are the discussions around copyright and the effectiveness of copyright[19] another is the discussion surrounding welfare and the

[19] Although interesting these aspects such as, a wider discussion on copyright term length, have either been left out of the thesis as they are not directly the topic being discussed.

Kaldor-Hicks efficiency and the Kaldor-Hick compensation principle. The discussion of the Kaldor-Hicks efficiency principle within cultural economics is used to show how the it is an interdisciplinary subject where law, economics, and the arts are central[20]. Kaldor-Hicks efficiency is similar to pareto efficiency which states that a allocation is efficient if there exist no trades where someone can be made better off. Kaldor-Hicks efficiency is a variation of pareto efficiency, but states allows for individuals to be made worse off by trades as long as the total improvement of the trade to welfare is positive and the losers of the trade are reimbursed for their loss. This would make some people better-off while ultimately not decreasing utility for anyone else, thus increasing efficiency. The previous is a strict interpretation, however the Kaldor-Hicks Compensation Principle dictates that as long as the welfare gains of a policy change, or other influence, is larger than the welfare losses then there has been an overall pareto improvement, even without compensating the losers (Towse, 2010). Policy discussions, including cultural policy, is discussed in terms of its financial costs and benefits to the economy (Throsby, 2010, p. 33) which makes the Kaldor-Hicks Compensation Principle a useful tool for when arguing for policy changes or increases in the support for the arts. This formulation the issue of efficiency and economic welfare is argued to derive from the rising cultural values of modernism outside of economics which became influential in economics which turned away from a verbal description of economic problems to a more mathematically focused one (Klamer, 1996, p. 137).

The economic agenda of cultural policy is derived from the idea of a "creative economy", the proposition is that creativity, in areas from the arts to technology, is a key factor in generating economic success by arguing that creativity is the prerequisite to innovation which in turn boosts economic growth (Throsby, 2010, p. 5-6). This implies that funding for arts and cultural goods can increase the amount of creative production in the economy, expanding the size of the economy and increasing welfare. Cultural and arts advocates, when arguing for government funding of the arts, also use the merit good argument which states that cultural goods are intrinsically good and should be supported in order to increase the quality of the output. This argument however implies that some individuals tastes are better than others, and so, violates an individuals right to sovereignty and equality as it is not the market and the tastes of the people deciding what is popular but an official deciding where the funding is allocated (Klamer, 1996, p. 17). Both cultural economics and law and economics are similar in the sense that economics economists are

[20]This is not to say they are the only subject areas within cultural economics but they are in a central role in research in the field.

more likely to be using mathematical tools with some philosophy underlying the modelling to argue their point while in law and the arts they are more likely to be more heavily focusing on the philosophy in their arguments. However cultural studies or the arts seem to have been more proactive in using economic arguments in their research and policy recommendations as there has been a observed trend where policy discussions are largely being discussed in the language of economics. In turn it seems that in the policy discussion in regards to cultural industries are more likely to use economic arguments while in law economics might be a tool of discussion but it not as popular of a tool for argumentation.

2.9 Economics and Psychology

Economics and psychology, at their core, are very similar research areas which focus human behaviour and the study of why we do what we as humans do i.e. why do we make the decisions we make? In fact much of the methodology of experimental economics derives from experimental psychology (Croson, 2002). Both subjects are in the field of social sciences and neither of the two are exact sciences, such as, math or physics could be viewed as such. As in social sciences in general, both the subject areas study human behaviour and as such struggle with finding exact causal links between behaviours and their causes. This is due to the fact that as a human we have a subjective experience of our surroundings which can be influenced by various factors. For example, why do some people decide to save and others not, even though they might be in identical situations in life with access to the same resources? Although economics and psychology are very similar at their core and both study humans who experience their surrounding subjectively, which in itself causes methodological difficulties, the methods used in the two subjects vary vastly. Six different areas of experimental research will be discussed in order to juxtapose how the fields of psychology and economics differ in the way they utilise the experimental method in their respective research. This will then shed light on the motivations behind the methodologies used in the two fields and specifically why the methodologies used in the experiments to generate data, which is the foundation of this thesis, were used. The six aspects of experimental discussed will be, incentives, market mechanisms, repetition, recruitment of participants, context, and deception (Madsen and Stenheim, 2015).

2.9.1 Incentives

Psychologists and economists have very different views of incentives and these differences can be largely attributed to the relative prevalence of experiments within the field. In psychology students are asked to take part as course credit or given fixed sum payments, while in economics the incentives are often defined according to a specific theory being tested (Hertwig and Ortmann, 2001; Smith, 1976) it is argued that the whole point of paying participants is to gain control of their incentives and to create an environment where their incentives are known (Kagel and Roth, 1995, p. 67). In economics theories being tested are often to do with incentives specifically or market outcomes which depend on how individuals react to the stylised market incentives (Madsen and Stenheim, 2015; Smith, 1976; Plott, 1982). For psychologists an individual's decisions are highly context and situation specific and thus use more subtle manipulations, such as subliminal primes, in order to mimic the real world influences. In addition psychologists believe that the costs and benefits of different situations are not necessarily clearly defined and so defining incentives can make the experiment less real world like (Ariely, Bracha, and Meier, 2007). Thus monetary incentives are integral to research in economics, especially as the area of study focuses largely their influence on individual decision making while psychologists place less emphasis on incentives and rather focus on ways to test decision making.

The following subsections closely follow the six aspects of research outlined by Madsen and Stenheim (2015) which are market mechanism, recruitment, incentives, context, anonymity, and deception. Incentives and recruitment have been combined into a single section as they are relatively closely related especially in terms of the research being discussed in the forthcoming chapters. Madsen and Steinheim outline the differences well and organize them clearly and thus backbone of the discussion is borrowed from the paper. However the discussion below updates some of the discussion by the authors along with, in some cases substantial, additions to their discussion especially when referring to the method of the research in the thesis.

2.9.2 Market Mechanism

Market mechanism simply refers to the market or experimental environment of the test subject and how behaviour is rewarded and punished in order to create a feedback mechanism which disciplines non-optimal behaviour (Madsen and Stenheim, 2015). This is especially important in economics as the theories tested can be in relation not only to individuals but larger markets or even industrial organisation more generally (Kagel and Roth, 1995, p. 21). A good example of exactly of how economic theories are tested using

experiments can be found in Smith (1976) where the author tests for the efficiency of market convergence to a theoretical equilibrium in differing market conditions. This can be argued to be a core article for experimental economists and is a good insight into the way experimental economists use experiments. Economic experiments can be grouped into three general categories, ones which focus on testing existing theories, ones which effects of variables which existing theories know little about, and theories which are motivated by questions raised by regulatory agencies (Kagel and Roth, 1995).

2.9.3 Repetition

Repetition in experiments is when participants are asked to play the same game repeatedly and results are then observed after every stage. This way it is possible to observe how behaviour might change as the number of repetitions increased, in a sense the data resembles time-series data. Economists generally use repetition in order to acclimatise the participant to the environment and to afford the participants with the possibility to learn how their choices interact with the choices of the other players (Hertwig and Ortmann, 2001). While psychologists do not typically use repetition in their experimental design (Hertwig and Ortmann, 2001). This type of repetition will overtime cause behaviour to tend toward the optimal and increase in external validity of the experiment in general (Loewenstein, 1999; Madsen and Stenheim, 2015). However there is some doubt whether the behaviour at the end of a series of repetitions is more representative of the behaviour of economic agents as the previous statement would assume (Loewenstein, 1999). This is supported by findings that show individuals find it difficult to transfer learning from one economic situation to the next when there is only a superficial change in the context (Bassok and Olseth, 1995). In addition it has been found that people have trouble transferring optimal behaviour from one situation or context to another (Hung, 2002). It has also been found that the time between stages can alter the effectiveness of the learning/recall potential brought through the use of repetition (Raaijmakers, 2003). The issue seems to be that there are some assumptions which are help about learning in the experimental environment which are assumed to transfer into the real world but might not transfer as elegantly as is commonly believed. Loewenstein (1999) argues that even though humans learn when they are in a tightly controlled experimental situation, this does not mean that they learn in the same way outside of the lab. Repetition has also been found to affect people's interactive behaviour at the end of repetition periods as come become less likely to cooperate at the later stages (Loewenstein, 1999). However there is evidence to suggest the evolution and the speed of convergence of different equilibria can depend on the group of participants and the type of game suggesting that fairness norms evolve depending on the context and the individuals taking part (Binmore, 1999). The effects of

repetition are heavily reliant on context. How much attention should be paid to results which are from inexperienced people put in situations which they know little about? If behaviour does not survive after participants have had time to familiarise themselves with the environment the experimenter has made a bad link between the lab and reality (Binmore, 1999). Although some might argue that it is not clear that repetition is more representative of economic behaviour (Loewenstein, 1999). There are findings to show that repetition can decrease the noise of the data in some, but not all, cases (Hey, 2001). In general repetition can be a useful tool in economics and has been successfully used such as in (McCabe, Rassenti, and Smith, 1998) or (Smith, 1976) to give some examples. In the experiments as a part of this thesis the aim was not to have a repeated game setting and gain time series like data but the idea was to rather get a cross section of different types of creativity with an additional control task.

2.9.4 Recruitment

Recruitment techniques between psychology and economics vary which can, to some extent, be explained by the attitudes towards incentives. Traditionally university students have been used as experimental subjects and can be argued to be good candidates as they bring very few external influences to the experiment and can be quicker to learn the new tasks (Duke, Huck, and Wallace, 2010, p. 8). University students are recruited for both psychology and economics experiments, however in psychology students are often recruited by giving them course credits (Hertwig and Ortmann, 2001; Croson, 2002). The reliance of psychology on their students as participants causes some methodological issues as the population is homogenous and the students are familiar with some of the theories being tested (identities and attitudes) (Madsen and Stenheim, 2015). However in the case of the experiments which were carried out as a part of this thesis the integral point of the recruitment process was to gain a relatively homogenous population i.e. art students in order to maximise external validity of the results[21]. Since use of experiments in psychology is more prevalent compared to economics which can go some way to explaining why participants are being recruited from the student base. Using incentives to recruit, as is done in economics, increases the chance of self-selection bias which can be a real threat to the internal validity of the results (McDermott, 2002). Self-selection could be decreased by having a system where participants are recruited from a selection of different courses or backgrounds and would conduct the experiment during their expected lecture. In general the self-selecting bias would only be completely removed if participants were not able to select themselves in or out. This however has its own weaknesses

[21] Further discussion in the methodology section

as not only is it unethical and illegal to force people to do experiments, but it can also cause problems in the types of populations or the potential homogeneity of the population which can be recruited. A good example of this is the use of psychology students in psychology experiments where they are not self-selected but do the experiments as a part of a course.

2.9.5 Context

Context, deception, and incentives are closely related as themes in experimental research as deception and incentives greatly affect the context of the experiment. In psychology deception is often used to disguise the real context or purpose of the research while in order to increase the internal validity while in economics incentives are used in order to create a certain market environment or make the experimental decisions more salient or 'real' (Ariely, Bracha, and Meier, 2007; Madsen and Stenheim, 2015; Duke, Huck, and Wallace, 2010). Not using deception for psychologists can mean losing contextual cues important real-world situations (Ariely, Bracha, and Meier, 2007). While in economics the justification for incentives is that as long as the individual maximises utility according to some given costs and benefits in the real-world, then as long as the incentives ae similar in the lab then the results should be relevant in the analogous real world situation (Levitt and List, 2007). This highlights how context is manipulated differently in the two fields and how the psychologists and economists differ in their approach to their experiments largely due to how their research interests diverge from one another.

2.9.6 Anonymity

Anonymity is associated as a part of a concept called social distance which refers to the distance that people have between themselves, such as, anonymity which might affect the way the people interact with each other (Charness and Gneezy, 2001). Anonymity is a standard feature in many economics experiments and is often added in order to eliminate observer effects and induce behaviour which would be exhibited under private circumstances (Charness and Gneezy, 2001; Bolton and Zwick, 1995). Psychology literature does not view anonymous experiments as such a crucial aspect of the experimental research, especially as the specific context of the social situation is considerably more important for psychologists compared to economists. In fact psychologists typically argue that even though incentives are used, other factors such as conformity or appropriateness norms which influence participant behaviour, while these considerations are often overlooked by economists who offer anonymity to avoid such influences (Madsen and Stenheim, 2015). Anonymity and privacy are different as anonymity allows the persons actions to

be anonymous however the actions are still knows and thus not private. This is important as a lack of privacy has been found to increase the shame in a selfish participant's experience, although providing privacy did not affect actual behaviour (Winking, 2014). This is supported by findings where introducing experimenter-subject anonymity had only minor, insignificant, effects on prosocial behaviour (Barmettler, Fehr, and Zehnder, 2011).

Although these findings are not to say that increasing anonymity has no effect on behaviour as increases in the level of anonymity have been found to increase the incidence of selfishness in dictator games (Hoffman et al., 1994; Hoffman, McCabe, and Smith, 1996; Charness and Gneezy, 2003). Anonymity was also found to decrease efficiency of auctions as face-to-face auctions where found to be more efficient in generating gains from trade, specifically they found that the face-to-face facilitated the gains from trade and not the communication (Radner and Schotter, 1989). However anonymity or the lack there of did not seem to affect the giving in ultimatum games which suggest strategic considerations crowded out fairness considerations (Charness and Gneezy, 2003). The varying results in regards to the experiments studying the effects of anonymity could be due to procedural differences (Laury, Walker, and Williams, 1995). There can also be some loss of anonymity due to incentives linked to behaviour within the experiment which would be evident in the payment received by the participant (Zizzo, 2010)

2.9.7 Deception

Deception is a concrete point of divergence between economics and psychology experimental research. Psychologists use deception to increase internal validity while economists focus on the use of incentives and avoid deception altogether (Ariely, Bracha, and Meier, 2007). In addition psychologists often use deception while economists do not (Hertwig and Ortmann, 2001). In fact papers which use deception are not publishable in economics journals (Gaechter, 2009). However economists use non-deceptive obfuscation sometimes referred to as implicit deception, which is when the experimenter withholds some information from the participant but does not give false information (Hersch, 2015; Zizzo, 2010). There exists scepticism about the blanket ban which economics have on explicit deception and argue that such a ban is inconsistent with their views of implicit deception (Hersch, 2015). Implicit deception or non-deceptive obfuscation is considered by some to constitute deception as the participants are not given full information (Bonetti, 1998). This claim however is disputed by arguing that only explicit deception can be considered deception while withholding information should not be considered deception (Hey, 1998). For economists the costs versus benefits of deception are tilted heavily toward not using deception, at least the explicit kind, while psychologists often do and view it as

essential to maximise internal validity, and presumably thus worth any costs associated with it (Ariely, Bracha, and Meier, 2007).

The costs of deception are considered to be the loss of trust within the subject pool which could foster mistrust for experiments within the subject pool. Psychologists consider the costs of using deception to be outweighed by the potential loss of research in areas, such as, conformity or racial stereotypes among others (Hertwig and Ortmann, 2008). There is little known about how much or to what extend participants in contemporary psychology experiments are suspicious or feel distressed by the use of deception in experiments (Hertwig and Ortmann, 2008). It is hard to definitely say that deception is or is not worth using in general and the benefit of deception seems to be more tied to the type of research done and the aims of the research rather than the perceived costs of deception in general. Deception was not used in the experiments as a part of this thesis but the technique of non-deceptive obfuscation was used instead. The aim was to make sure participants were not influenced by the copyright frame as it is likely that the participants had strong opinions not only because they were art students but because it is also likely many will be in copyright industries in the future.

2.10 The Cross Section Between Law and Economics

The first half of the section focuses on the intersection between economics and psychology and how experiments are used in the two areas of research. The rest of the section focuses on the intersection between law and economics and the advantages and the challenges of interdisciplinary research between the two. Law and Economics, much like economics itself, consists of many different subsections which differ in the assumptions they make and the methods used. There are two major distinctions in style and method between neoclassical economics, which rely heavily on the theory of a rational decision maker, and behavioural economics where this assumption is often criticised and its weaknesses highlighted. The neoclassical branch of economics draws its inspiration from the hard sciences and the Popperian tradition of falsification by deriving models which are empirically verified (Rowley, 1981). The behavioural branch of economics draws inspiration from psychology and in fact many behavioural economists are psychologists, for example, Kahnemann and Traversky who proposed prospect theory (Kahneman and Tversky, 1979). Many of the criticisms of the neoclassical approach stem from the falsification of the more strict interpretations of neoclassical theories arguing that it is problematic to stick to imperfect and thus falsified theories (De Geest, 1996). What is meant by a strict neoclassical theory is, for example, the theory of the rational actor who is fully informed and can

choose the optimal, i.e. utility maximising, option from all the available choices. However there is considerable evidence suggesting that humans' exhibit bounded rationality where by the selection process between options is not exhaustive but rather heuristics or rules of thumb are used to aspire to some level of satisfaction dictated by the individual (Davis, Hands, and Mäki, 1998, 395). These discussions between factions of economic thinking also occur in law and economics where authors employ varying methods of economic analysis in order to discuss the effectiveness and justness of existing or proposed laws and legal doctrines.

2.10.1 History of Law and Economics

The history of law and economics is a sensible place to start when discussing law and economics as a subfield of economics because it gives a unique perspective on how the field evolved and why the field evolved the way it did. If we look back to the late 1700's we can find a famous and not necessarily widely known example of law and economics intermingling as subject areas. Adam Smith, who many consider to be, if not the father, then at the very least a god father of modern economics, was himself a lecturer in Law at the University of Glasgow and even gave lectures in jurisprudence (Hylton, 2005). Although it can be argued that law and economics had its beginning even before the 1700's with Thomas Hobbes who argued that the purpose of law was to maximise social welfare (Hylton, 2005). The idea of law maximising social welfare is interesting and can be found in copyright as well with the utilitarian arguments which laid the groundwork for The Statute of Anne, as detailed earlier. Thus law and economics have historically been closely related not only because of both being social sciences but also because of their close relation in terms of the underlying philosophy.

It is argued that historically speaking the economy and law both evolve in a social system which is subject to Darwinian evolutionary principles and that those evolutionary principles can be used to explain both business practices and the law (Atkinson and Paschall, 2016). Economics and law have also been argued to be mutually influential on each other to the point that they are not just related to one another but in fact influenced by one another to the point that they are not separate (Samuels, 1988–1989). If taken to the extreme this argument either suggest that a field of law and economics is crucial as the two subjects are so intertwined or even that differentiating between the two might not be necessary. It is useful to differentiate between the two as they are quite clearly different but the previous does help to highlight the close nature of the two fields. The relationship between law and markets has been recognized as early as Adam Smith and Jeremy Bentham who were both late 1700th century legal scholars. Adam Smith focused on the impact of regulation on economic activity while Jeremy Bentham focused on legislation

from the perspective of utilitarian political philosophy (Posner and Parisi, 2016a para 1). Utilitarian political philosophy, as discussed in the literature review chapter, focuses on the idea of the greatest amount of good for the greatest amount of people. Utilitarian political philosophy would then refer more towards how this philosophy can be achieved through law and political decision making.

2.10.2 Rationality Assumption in Law and Economics

When discussing economic modelling it is important to realise that economic models are not necessarily describing exactly what is going on. Rather more like a map or illustration of the mechanics of some interaction, market, or environment described using math in order to bring structure and clarity to the theory or explanation. Economic models are not mechanistic tools, or predictive machines as such, rather tools for understanding economic phenomena (Henry 1998 p.5). One issue in economics and in law and economics is to decide which assumptions can or should be placed on behaviour when modelling these phenomena. The crucial element is balance, it is important to balance the simplicity the assumption provides, either mathematically or in terms of the explanation, with the loss of realism or even loss of predictive power[22]. If the assumption is too strict or, for lack of a better word unrealistic, it can make the model unusable when trying to model "real world" behaviour, even though the model itself could be very eloquent. On the other hand, if no assumptions are made or they are not strict enough, it can cause the model to be too complex or convoluted to be understandable or even possible to model properly. These models are inherently imperfect representations of the real world but fit for purpose in the way they can help to explain a given phenomenon or be used to forecast[23] effects of a change in the economic or legal environment. One of the most hotly contested an assumption which is often made when modelling economic phenomena is the assumption that humans are rational which derives from the rational choice theory (RCT). An assumption that follows from it is the assumption that individuals maximise utility, in the case of companies this assumption is that they are profit maximising. To maximise utility simply means to maximise happiness or wellbeing, what exactly this means can differ from one situation. To give an example if we assume the only variable where people derive utility from is money then to maximise utility would mean to maximise wealth. There can obviously be other considerations other that simply wealth but if the environment is such that the only moving factors or variable is wealth then the two would have to be equal.

[22] in the case of predictive models.

[23] The point of these forecasts is not to be perfect but give an good indication of the consequences of an action or change

Although there is a need for theoretical work much of the existing theories in economics are, at least by some, thought to be based on hypothesis with ideal and logically tidy considerations (Machlup, 1978). In the light of empirical evidence from behavioural economics some argue that the assumption of a rational decision maker is not accurate and that behaviour and observed choice making is not as consistent as the theory would predict due to bounded rationality (Jolls, Sunstein, and Thaler, 1998; Davis, Hands, and Mäki, 1998). Behavioural economics[24] has limited resemblance to a priori reasoning[25] regarding rationality, competition, and competitive markets (Boumans and Davis, 2015). Since behavioural economics is more focused on experiments and empirical evidence it can be thought of as using posteriori reasoning. A significant amount of experimental evidence which challenges the idea of rational choice comes from outside either outside of economics or from the fringes of the field (Davis 1998). In fact empirical findings regarding human behaviour form cognitive and social psychology lead to different predictions and policy options compared with models using RCT (Ulen, 2014, p. 93).

This is relevant because law and economics typically does rely RCT which is a standard economic assumption (Posner and Parisi, 2016b). As a field it can be defined as the application of the rational choice approach to law (Ulen, 2014, p. 797; Parisi, 2004; Jolls, Sunstein, and Thaler, 1998, p. 262) and its use in maximising expected utility (Pacces and Visscher, 2011). The assumption of rational choice is thought to threaten the validity of law and economics because of it being unrealistic core behavioural assumption. The authors continue by suggesting that law and economics can reinvigorate itself by replacing the rationality assumption with a more neuanced understanding of human behaviour which takes into account fields, such as, cognitive psychology or sociology for example (Korobkin and Ulen, 2000). The counter to this argument is that the theories do not predict all behaviour but behaviour at the margin, or the people who would change their behaviour due to a change in their environment (Pacces and Visscher, 2011). In addition behavioural economics is already taken into account in law and economics literature and that the assumption of a hyperrational, emotionless, and unsocial economic actor has been abandoned. The author continues by stating that the idea of knowledge and imagination being bounded does not mean that the framework of a rational choice theory cannot be used even if there are positive transaction costs (Posner, 1998). Thus arguing that even thought it might be true that rationality is bounded it does not mean that economic models could not use RCT as a framework. Economic theories, typically, are

[24] which can be thought of as a mix between behavioural economics and experimental economics

[25] A priori reasoning is reasoning before an event, e.g. given some environment and variables some prediction of the effect of a change in a variable can be made. This is an example of a priori which is reasoning based on self-evident truths (but do not necessarily have to be truths it can also be based on some assumptions of the state of the world in economics for example).

considered to be based on strong assumptions of rationality and foresight and the quality of the theories are evaluated on elegance and the sharpness of the prediction (Holt and Sullivan, 2017, p. 80). Thus if this is indeed the case it would, at least to some extent, explain the prevalence of RCT in economics. It is a theory which makes mathematical modelling simpler and is to some degree an intuitive assumption to make, because after all, humans do look for the best deals and put painstaking effort to get the best deal. But it is also true that we are bounded by factors such as time, effort, and even our processing power or IQ when we make economic decisions ranging from purchasing insurance to which toothpaste to buy.

2.10.3 Normative versus Positive Law and Economics

Law and economics is often separated into two types, normative and positive law and economics. Simply put positive law and economics seeks to explain the law and the legal system as it is while normative law and economics describes how the law or legal system ought to be (Hylton, 2005). To give another example positive analysis is focused on how agents behave in response to a legal rule and how these legal rules should be shaped while normative analysis is concerned with assessing more broadly the ends or goals of the legal system itself. Although the same authors also forwarded a third suggested category, prescriptive, which focuses on which rules should be adapted to advance specific ends (Jolls, Sunstein, and Thaler, 1998). It should be mentioned that prescriptive analysis seems to be more relevant for behavioural economics but not necessarily as relevant for the wider law and economics. The distinction can be important as there is a difference between attempting to say how a legal system should be (normative) and how it is (positive). An author attempting to conduct positive research, for example, can stray into normative territory by not only explaining their results as a matter of fact but also adding their own analysis of the situation and its perceived effectiveness or efficiency as a legal rule or reality. This can distort the authors message and make normative claims that are presented as positive, thus it is important for the author to be clear in their intentions in order to effectively communicate their agendas. This has been found to be problematic when judging whether a study is positive or normative as the final interpretation is likely to be swayed by personal opinion of the author or school of thought implemented in a piece of work. The same author also found that the type of law in question can also influence the authors ability to stay within the scope of positive analysis without making judgements about how the law ought to be (Bruce, 1988).

Observing the wider law and economics literature there seems to be some differences between what is considered normative and what is considered positive. Some state that

law and economics authors tend to painstakingly distinguish between positive and normative economics in order to protect themselves from normative criticism of their proposed theories (Crespi, 1991). However the question is what really is normative and what is positive? Can the interpretations of these change from person to person? Semantics are important in law and being able to communicate the exact meaning of what is intended is imperative, especially in areas such as contract law where a slight difference in wording can change the contract completely. There is evidence of the two concepts being interpreted differently, it seems especially contentious as to what is and is not "positive" research. The Chicago school of law and economics or Posnerian law and economics will be used as a type of mini case study. This is because there is a culture of using economic theory in order to model and predict the impacts of law on society, which inspire prolific debate within the field of law and economics.

When it comes to criminal law Posner states that "moral" theory is not as an effective positive form of analysis of law as economic analysis is (Posner, 1985). Similar use of economic modelling and the economic analysis of law can be found, for example, Landes and Posner (2003).The use of microeconomic methods in law and economics has been criticised as having limited usefulness and closer to an attempt at social engineering rather than understanding legal phenomena as it is (Jackson, 1984). The claim that selecting relevant concerns and identifying relevant assumptions are purely normative, not only in law and economics, but economics in general (Hovenkamp, 1990). This is in essence a criticism of the neoclassical economic approach also as the author seems to argue it to be normative in the way the subfield discusses legal policies being analysed in a positive fashion.

A significant argument against economic modelling being a positive form of law and economics focuses on the assumptions made when modelling. It is argued that making certain assumptions on what is and is not valuable, or what is value, already implies certain judgements which makes a positive analysis using mathematical models very difficult in law and economics (Leff, 1974). In contrast it is argued that positive arguments derived from a popperian approach, are testable and empirically verified and as such, not only a positive approach but useful as a device for the economic analysis of law (Rowley, 1981). This rift seems to be largely derived from different authors views on the methodology of economic analysis which is then argued to either be an effective tool of positive analysis or a normative analysis and subjective analysis which attempts to pass itself of as objective. The views of the authors on both sides of the argument are far more nuanced but for the sake of argument have played the devil's advocate but non-the-less it seems to shows some division in how economic analysis of law is viewed within law or by lawyers.

2.10.4 Experimental Law and Economics

In economics experimental methods are relatively new with the method became more well known in the 70's with Vernon Smith's Induced Value Theory in 1976 and Kahneman and Traversky's Prospect Theory in 1979 (Smith, 1976; Kahneman and Tversky, 1979). It can be argued these two works were instrumental in elevating experimental economics to a more accepted methodology within economics. Induced value theory an important for tool for experimental economists and in some ways can be thought of the foundation for welfare analysis using experimental data. The main idea of an induced value is that participants exhibit some non-satiable preferences for some resource, usually money[26], which can be induced to exhibit a preference ordering (Parisi, 2017, p. 82). Alternatively an induced valuation means that participants are compensated according to a theory being tested and the choices the individual in the experimental situation makes (Smith, 1976). As discussed in earlier sections this induced value is closely tied to incentives being used which are created to test a given theory. Using these induced values it is then possible to measure economic efficiency by comparing the new wealth created[27] (Parisi, 2017, p. 82-83). These tools allow theories to be developed about behaviour which can then be tested and the effects quantified, at least approximated, which can be useful when studying the effectiveness of law. The great strength of experiments are a high internal validity the potential to isolate single effect using experiments which can inform a driving force of any differences between treatment groups (Engel, 2014, p. 135). Experimental economics although closely related to behavioural economics, e.g. Kahneman and Traversky 1979, there are some distinct features of behavioural economics which are worth discussing separately from experimental economics.

2.10.5 Behavioural Law and Economics

Behavioural law and economics contributes a substantial amount to the empirical evidence within law and is a large contributor to the study of legal policy (Engel, 2014, p. 126). Behavioural law and economics, like behavioural economics, can be seen being more closely related to psychology than to neoclassical law and economics. Behavioural economics has been used well in order to broaden the scope of law and economics without losing coherence of the theory (Calabresi, 2016, p. 4). The methodologies used in behavioural economics are often derived from psychology literature and are often cited in the criticism of neoclassical or Posnerian law and economics (Posner, 1998; Korobkin and Ulen, 2000; Jolls, Sunstein, and Thaler, 1998). Behavioural economics is a relatively

[26] crucially this should be true at least in the context of the experiment

[27] This can also be other aspects such as, productivity of some resource and not necessarily limited to wealth creation but rather creation more generally

new subfield in economics and for it to be gain support and new theories from outside of economics which makes sense as often new ideas or different approaches often arise from a fresh new perspectives which might come from different fields.

An example of a deviation of behavioural law and economics from traditional law and economics is the relaxation of some assumptions, such as the RCT, compared to the standard law and economics (Engel, 2014, p. 125-126). Some see behavioural economics not as a specific body of economic theory but rather a critique of the neoclassical theory and methodology (Davis, Hands, and Mäki, 1998, p. 395). Psychologists and behavioural scientists aim to create theories which are more in depth and only explain a behaviour for a certain group or for a certain context (Madsen and Stenheim, 2015). The focus of behavioural economics of law is the behavioural approach to the law and legal problems compared to advocating any given model of human cognition and motivation to compete with the dominant existing models of economics of law (Mitchell, 2014, p. 168). Behavioural economics has also recognised to be a useful tool for economic analysis on law, although there is some disagreement on the validity of some of the criticisms of the neoclassical method made by behavioural economists (Posner, 1998). All this taken into account behavioural economics has contributed in the field of economic analysis of law by answering questions previously left unanswered in the field (Calabresi, 2016).

2.11 Conclusion

How are experiments useful specifically for interdisciplinary research between the fields of economics, law, and psychology? Firstly economics has been thought to provide both behavioural theory and normative standards which law lacked (Cooter and Rubinfeld, 1989). Thus there is a very real added value of using economic theory when discussion the effectiveness or impacts of law. A natural continuation of this is to introduce some of the methods of economics, such as experiments, and use them to directly research the impacts of law on behaviour. In addition economics has been thought of as a universal grammar of social science, in relation to its structured organisation of equilibrium's especially relating to social issues (Hirshleifer, 1985). It was natural to use economics as the foundation and use tests derived from psychology in order to be able to comment on the influence of law. Economics and psychology are closely related and allow for psychometric performance to be measured and the influence of the external market environment to be analysed. In turn can be used in order to comment on the influence of law on the economy and economic behaviour. This is exactly the aim of the method discussed in the subsequent chapters.

Chapter 3

Methodology

3.1 Introduction

The previous section discusses interdisciplinary research and the strengths and weaknesses of the experimental method. The experiments conducted for this thesis will be explained in detail along with the reasoning for the specific methodology chosen. Creativity research in general has a large element of subjectivity tied to it so by no means will it be completely objective[1], although steps have been taken to maximise objectivity in the current research.

Creativity and creative output can be influenced by many factors and therefore it is difficult to pinpoint why differences in creative output may occur. These differences can be due to intellectual property regimes, openness of society, different cultural policies among a long list of other factors which could influence output. These factors also limits the ability to use natural experiments as it can be difficult to control for regional differences. This would make it difficult to observe if the differences were due to copyright regimes or differences in environment/social structure. For example, if there are two regions with different copyright regimes it would be difficult to control for differences in their environments which is in itself hard to pinpoint how it affects creativity. Using experiments allows one to control the creative environment. Varying the treatments would cause differences in the environment but if individual idiosyncrasies can be accounted for then the individuals' in the different treatments are effectively the same. Making the treatment the only variable to be concerned with.

The methodology of the experiments that provide the foundation of this research is an amalgamation of methodologies from psychology, law, and economics. The tasks and the methodology used to measure task performance are sourced largely from psychology literature relating to creativity and creative performance. The experimental structure and a large part of the experiment instructions are formulated using copyright law as a

[1] Although this can be said to some degree about all research, it is especially important to acknowledge when researching creativity.

base. The structure and mechanisms of the market are created using cultural economics and economics of law literature. The stylised market for creative goods which participants operate in, is constructed using economics literature describing markets for creative goods.

To give the research a clearer and wider scope, law concepts,such as attribution right and economic right, are replaced with more general concepts which describe their effect in the market. Attribution right is the right to be named as the author of a work[2] and affords the author of the work the control over their reputation[3]. This right influences what information is given to individuals about the artists and so a treatment called public information or (PI) treatment is added.

An economic right gives the holder of the economic right the ability to financially gain from a creation. For example, if someone owns the economic right to a song they are legally entitled to the revenues from it. The economic right influences the individual's ability to economically gain from the work as it is a legal right to the returns[4]. The right simplifies to whether it exists or not. If it does then individuals have the right to returns and it depends on their success in the market which exhibits a tournament pay structure. If it does not, then pay will not be influenced by performance since rights for the returns would not be guaranteed in the market. The main aim of the research is to be able to identify effects from public information (PI) and tournament pay structure (TP) on creative performance or creative output. The results can contribute to the conversation about the effectiveness of copyright in motivating creative production.

Public information in the context of the experiment is public information about who is the creator of each expression. However in the public information treatment there is no specific protection of anyone's expression after the expression has been created. The key to the attribution right is the ability to control/protect a work once it was been created and the right to be named as the author of work/expression. This means that the expression can not be modified unless the artist gives express permission for it. There is also the right for the artist to be named as the author as the work which means someone

[2]This right can even include the right to maintain the work as it was when it was sold. This is to say the creator of the work will have the right to restrict changes to the work once sold. This is especially relevant to paintings.

[3]This is one of the arguments for an attribution right. The argumentation involves natural rights and how an individual's work is an extension of themselves. Thus is follows that the artist should have the legal right to control themselves through being able to control their work and through that their reputation. This is the simplified version and by no means constitutes a full overview of what an attribution right is. For further discussion one can refer to chapter 1.

[4]This is a simplification of the economic right. Even when economic rights are granted to the artists' the nature of the contract they sign can in effect strip them from this right in exchange for some royalties or even a flat fee. Caves book 'Creative Industries: Contracts Between Art and Commerce' or 'How to Fix copyright' by Patry. The aim however is not to perfectly mimic an economic right, rather to observe how these monetary incentives might influence creativity.

who bought the work can not take credit for creating it. None of the expressions can be modified after the expression has been created and thus the way attribution right is simulated in the experiment is through the naming aspect of the attribution right. Thus the public information condition is mimicking attribution right because the authors of each expression are given publicly.

Economic rights are the legal right to sell or licence an expression or work of art. Strictly speaking this does not guarantee any income, even if someone has an economic right to a work doesn't mean anyone will want to buy or license the work. Thus the ability to exploit the economic right depends on the market performance of the expression. Moreover the market for creative goods is generally a winner-takes-all market where earnings distribution is close to a tournament pay structure where the top performers make a lions share of the economic gains which are made in the market. Thus the tournament pay structure condition has a top heavy pay distribution which is given to the best performers in the market as decided by other participants who act as the consumers. Thus the tournament pay condition is more closely tied to the economic rights afforded to authors compared to the public information structure which focuses on the naming aspect of attribution rights. This means that the tournament pay and public information treatments are designed to mimic economic and attribution rights respectively, in order to create a close as possible experimental analogue.

An important aspect of the research methodology is thus to mimic the market structure and incentives in the market as accurately and consistently as possible. However, markets can be quite dynamic with multiple variables effecting the environment and the incentives, and how the two interact. The best way to tackle the problems caused by this dynamic market is to make abstractions and create a stylised market where individual effects can be studied as mentioned before. Thus, four treatment groups were organised in order to study the individual and combined effects of both public information/attribution and tournament pay/economic rights. The below table maps how the attribution rights and economic rights map onto the two treatments of public information treatment (PI) and tournament pay treatment (TP). If both PI and TP exist then both will have a check mark. The control group had no (PI) treatment or (TP) treatment and so has no check marks on thither row. The 4 columns represent the 4 different treatments used in the experiment.

TABLE 3.1: Public Information and Pay Structure in Treatment Groups

	Control	AR	ER	AR and ER
Rank Information Public (PI)		√		√
Tournament Pay Structure (TP)			√	√

AR is attribution rights, which is the right to be named as the author of a work. ER is economic rights which is the right to economic ownership of a work e.g. a piece of art or a song. Both concepts derive from copyright law.

A good start when studying the effectiveness of copyright, the influence of public information and tournament pay on creative performance, is to combine research from the field of psychology with economics of market analysis, and place this all in the context of the copyright law. Interdisciplinary nature of the research is crucial in order to 1: ensure measurements of creativity are as objective as possible, in the context of the creative markets and 2: maximise the research relevance to the discussion of effectiveness of copyright law. As discussed in the earlier sections of this thesis, these subjects are not fully aligned in their experiment methodologies. The methodologies used are akin to economics and are combined psychology and law literature to make the research relevant to all fields.

3.2 Format

The influence of PI and TP on creativity are studied using an experimental setup mimicking the structure of creative markets, specifically financial incentives and information available within the market. The first key aspect to a stylised market place is the ability to have instant feedback about relevant developments in the market, while allowing information for the PI group and restricting information for the non-PI group. This is achieved with a software that communicates the information to a server but relays only the relevant information to each treatment group. It is essential to differentiate between an idea and an expression since this is a crucial distinction between something that is not copyrightable i.e. the idea, and something that is copyrightable i.e. an expression of an idea. This means that the idea of, for example, a painting of a bowl of fruit is not copyrightable, however the way the bowl of fruit is expressed in the painting is copyrightable. This means that, in general, if someone wants to paint a bowl of fruit they need to have an original expression of that bowl of fruit and not simply copy an existing work. The restriction of information is especially relevant to the PI treatment groups where information on the author of an idea/expression is shown in groups with public information

i.e. P.I. Groups. Conversely no information about the creator identity is shown to the non-P.I. groups. In the following sections the specific method of how the experiment is organised is explained using four areas of interest. These are information in the market, infringement, market demand, and supply and demand in the market. Each section details a specific challenge of how to create a market for creative goods and how 'copyright' is set up in the stylised market.

3.2.1 Information in the Market

In the market, determining what is and is not infringing a copyright is difficult as there can be simultaneous creation. In this case individuals have the same expression of an idea, but create them independently of each other, with no knowledge of the others creation. This situation would not be considered copyright infringement as there is no theft of intellectual property. The logic is that one cannot steal something they do not know exists. However, if there is full information about creations and each creation takes a small amount of time, it is unlikely that simultaneous creation will be an issue.

In this context full information means that each market participant knows of each expressions which is created; expressions are public information for every market participant in real time. The challenge is to take these nuances of copyright law into account in the experimental set up and the stylised market place[5]. The assumption of full information is critical to be able to simplify the setup and to discard cases, such as simultaneous creation or cases where creators are not aware of the existence of works that are similar or even identical to theirs.

In addition to full information about what expressions were created, the PI treatment groups also received information about who created the work. Hence, there is full information available to all participants about the works or expressions created with an additional set of information about the identity of the creator for only the PI treatment groups. The information regarding the creator has no repercussions as to how copyright is enforced in the stylised market. It does give an indication of who in the market is being productive and thus potentially gaining a larger market share of all expressions. The more expressions one creates in the market the larger their market share and the larger their chance of being noticed. This notoriety can help them to be more popular in the market, popularity which ultimately dictates their rank/success in the market. The availability of information has been manipulated for two main reasons: First, to bring an aspect of attribution into the market place which can potentially influence behaviour. Second, create a simpler copyright environment where some of the nuance and uncertainty

[5]More detail about how the stylised market place is set up will be given in a later subsections

of copyright is minimised to facilitate clarity. It is also essential that the non-PI conditions do not give any information about the creator of the ideas shown and the same pressures regarding who is creating the ideas does not exist. It is possible that the lack of the information regarding the identity of the creator, of each expression in the market, makes the competition aspect of the creation process less salient. Compare this to if full information about the creator of each expression is public information.

3.2.2 Infringement

Given that assumptions of full information regarding the existing expressions can be made[6], it is possible to extend this and create a copyright environment where infringement is judged. Considering all ideas are known to the creator it is possible to observe the list of expressions and identify similar and possibly infringing expressions. This simplifies the problem of infringement to whether the expression is similar, and if they are which was the "original". Simplifying the problem of infringement is crucial for the stylised market environment. It helps to solidify the assumption of full information because the expressions are either simultaneous creations if created within seconds of each other, or copies[7]. If two creations are similar then the earlier expression remains and the later expression leaves[8]. This introduces a very real advantage for the first creator which can induce people to submit ideas more quickly and consequently quality could suffer as expression are not thought through. These rules for infringement would not differ between treatment groups but some level of copyright exists in all treatment groups. However, in some treatment groups the first mover protection has no impact on either the individual's reputation or pay. In these groups it is assumed that the effect of first mover protection on the expression created negligible.

3.2.3 Market Demand

Considering infringement and full information, the mechanism of deciphering success within the market is the next aspect of the stylised market for creative goods. This requires a type of ranking between market participants where they are ranked based on the popularity of their expressions. For example Picasso can be judged to be more successful in the market place compared to some unknown artist because of his works being more

[6]Full information of creation is important because then each participant knows what has been created and can avoid creating the same expression.

[7]It could also be a mistake but even so the first creator would have the right to the expression. In the case of simultaneous creations the first one to author the expression has the right to it and so the case of simultaneous creations has been simplified in the stylised market.

[8]Normaly I woud say "is discarded" and note "leaves" but I couldn't resist a reference to brexit.

popular and therefore a willingness to pay for those works. However this popularity in the market is heavily subjective and can sometimes even seem random, it is important to mimic this quality of the market. To do this it is first important to know that the market only consists of expressions which adhere to the rules of copyright. With the knowledge of market participants are fully informed about other expressions in the market and infringing expressions are discarded[9] from the market place. The remaining expressions can be subjected to the scrutiny of the consumer. This scrutiny, as discussed previously, is subjective and need not be based on anything else but subjective judgments.

Market feedback is crucial as it informs the creators decision in the future about what is popular or not. The information participants receive from the market is a key aspect of how the treatment groups have been organised. Public information regarding market feedback is just as crucial because participants are observing other market participant's actions in real time. Information such as what is being created and by whom, as is shown in PI groups, allows participants to instantly adjust their strategy based on the market feedback they receive of other participants output decisions. This information can change the strategic decision making even before the feedback from the market, i.e. information of ones own or other participants rank.

3.2.4 Supply and Demand in the Market

The specifics of exactly the experiment is set up in the "Experimental Design" Section and related sub sections. The following is a general overview of the process designed to give a broad insight into the dynamics of the experiment. The expressions or ideas produced during the two creativity tests are used as a proxy for production in the market for creative goods. The expressions created in the creativity tasks mimic the creation of a song or a piece of art in the market place. The specifics of the process of creation within the stylised market is explained in full in the 'Creation in the Market' section. The next important aspect of the market is how the property rights are enforced. This explanation can be found in the 'Rights Enforcement' section dictating how copyright is enforced in the stylised market. Now that there is supply and rights enforcement in the market, there needs to be a demand to round out the market. Participants from other groups are asked to give their subjective judgments on the expressions created which would then dictate performance. These judgments give relative value to each expression with more value assigned to the expressions that were judged to be of quality. This process is explained in detail in the 'Mechanism of Deciding Popularity' section. These subjective judgments proxy demand in the market as individuals largely base their spending decisions on their

[9] This process is explained in full in the 3.2.4 section.

own subjective judgements. These two aspects, the 'Creation in a Market' and 'Deciding Popularity' respectively guarantee that there is a supply and a demand in the market. The supply and demand then interact to guarantee competition and a market pricing mechanism for the supply.

This interaction is not as dynamic as it is in the real world market and not a dynamic value for creations based on some aggregated demand in a large market. Rather there are set awards for a given rank decided based on the popularity of submitted expressions. The distinction is that the market size in the real world can increase or decrease based on how 'trendy' a type of art is or based on some relative quality compared to other art forms. This would affect how many individuals would be interested in purchasing a type of art. The market for a type of art can expand or contract based on its relative trendiness or importance within the art lovers community, or even the art lovers community itslef could expand or contract. This dynamic interaction between total demand in the market can drastically increase or decrease the value of a market. In contrast the stylised market has a set value and does not expand or contract. Meaning the value of the market is constant and does not change due to competition for demand from other markets. The market is assumed to have a set value and this set value is similarly distributed between the market participants and the distribution found in creative markets. That is to say the distribution of prizes between ranks has a fat upper tail similar to a tournament pay structure. The rank is dictated by the popularity or simulated demand[10] and the supply/competition is simulated by the expressions created by the participant and the participants competition in their group.

When conducting experiments it is vital to know that as many exogenous factors which could affect the results are taken into account. Creativity can vary from one individual to another for many different reasons as shown later in the section. This is why it is crucial to first identify aspects which can cause creativity to vary on an individual level and then find ways to control for these differences. Surveys before and after the experiment are used to elicit differences between participants which can then be taken into account during the statistical analysis phase. The following sections run through research on aspects which can cause creativity to differ on an individual level.

[10]Which is the quality of a participants expressions as judges by other participants. Thus assigning value to their expressions and simulating demand in a market when these value judgments from all the judges are combined.

3.3 Individual Differences

3.3.1 Why Individual Traits Are Relevant

Success in the market for creative goods is associated with an almost random 'nobody-knows' principle which essentially argues that it is often hard to know what is successful in the market (Caves, 2002, p. 3). However this does not mean that just anyone can jump in and be successful, there are some requirements in order to succeed, a baseline skill or talent level if you will. There are many variables which can affect creativity, as will be discussed below, and it is important to control for these variables. Although the measurement of these control variable are not going to be perfect it is important to construct proxies wherever possible in order to maximise the strength of these controls. The 12 controls used are: Age, gender, creative efficacy[11], math efficacy, ambiguous risk, risk aversion, language, handedness, institution of study, arts hobby, preference over rich or famous, and if the individual has family in the creative industries. These have been found to influence or potentially influence creativity or creative thought. The better the variables which affect creativity are controlled for, the more accurate the estimation of any potential effect of the control groups will be. Thus by controlling for individual differences it will be easier to observe the real effect of changes in the market environment. The explanations of the controls are included in the context of a general discussion of what influences creativity in order to gain a more comprehensive understanding of creativity and its influences.

3.3.2 Age and Gender

There are some indications that age and gender do influence creativity, but exactly how this is can be quite complicated. Overall both gender and age can influence creativity thought many different channels, for example, age can influence performance through more experience or practice. These both have to some degree been covered by the variables degree year and arts hobby and thus the influence of age would likely not take into account these possible influences. As people get older it is not necessarily that individuals become less or more creative but are creative in different ways compared to younger individuals (Abra, 1989). Interestingly men had higher public achievement[12] but equal private achievement to women (Runco et al., 2010). This indicates that men could potentially have differences in performance in the public information conditions. Even though

[11] The concept is explained in the 3.3.7 section.

[12] Public and private achievement were derived from a survey responses. Public creative achievement was creative achievement in a public forum or space.

the influence of gender and age are likely to be very complicated it is useful to add them to observe if there are other influences from gender or age outside of the other existing influences already taken into account such as risk preferences, experience, and practice or hobby.

3.3.3 Handedness and Brain lateralisation

The study of brain lateralization is the study of how different cognitive processes are specialized to one side of the brain or the other like language or visuospatial processes (Nielsen et al., 2013)[13]. In general it is beleived that creativity is a right brained activity while logical thought a left brained process (Nielsen et al., 2013). The theory that left handed individuals who would have a dominant right hemisphere of the brain would be more creative follows. This can be tested for by collecting information describing test subject's dominant hand or if they are ambidextrous. If they are left or right-hand dominant then the theory is that they are left brain dominant if right hand dominant and visa versa, however if they are ambidextrous then no conclusions can be made about brain lateralisation based on handedness. Although there is evidence of heightened communication between the two hemispheres in people who are ambidextrous (Moore et al., 2009; Nielsen et al., 2013; Shobe, Ross, and Fleck, 2009

There is some evidence of lateralisation in type of thought processes; it was found that right handed individuals preferred a local and executive thinking style while left handers preferred a legislative, judicial and hierarchical thinking style (Alipour, Akhondy, and Aerab-sheybani, 2012). When people have a local thinking style they prefer to work on tasks that require concrete details compared to when individuals have an executive thinking style they prefer to work with clear instructions and structure and prefer to implement with set guidelines (Zhang, 2015). On the other hand (pun intended), a legislative thinking style is when an individual prefers to work on tasks requiring creative strategies and where they can choose their own activity (Zhang, 2015). A judicial one is one that allows for one's own judgement, and finally a hierarchic style is when people prefer to divide their attention between multiple tasks ranked in priority according to their evaluation of the tasks (Zhang, 2015). This would suggest that right handed (or left hemisphere dominant) individuals prefer tasks which have clear instructions and structure and which require working with concrete details, tasks which are associated with a stereotypical "left brained" thinking style. Conversely left-handers (right-hemisphere dominant) preferred tasks which required creative strategies, one's own judgement, and preferred to divide

[13]Simple definition found at the Free Dictionary http://medical-dictionary.thefreedictionary.com/lateralization

their attention between multiple tasks. These traits have been stereotypically been associated with creative personality. There is evidence to support the hypothesis that right-hemisphere dominant individuals are more creative as there does seem to be associations between creative thought and predominant right hemisphere processing (Lindell, 2014).

Hemispheric preference has been found to be influenced by cultural factors in a study where the researchers compared hemispherical processing preference and found that in the same task Americans had a preference for left-hemispherical processing while Japanese individuals showed a preference for right hemispherical processing in the same task (Hiser and Kobayashi, 2002). The same study found that the Japanese were more feeling oriented along with a preference of the left-hemisphere and the Americans were more statistically oriented with a preference toward the right-hemisphere, which is consistent with the left/right hemispherical model (Hiser and Kobayashi, 2002). This would suggest that hemispherical preference is influenced by environmental factors assuming that the genetic populations would be more or less the same in Japan and America when it comes to brain lateralisation.

The evidence is not one sided when it comes to creativity and brain lateralisation however, there are studies which suggest creativity is more about connectivity between the hemispheres of the brain (Moore et al., 2009; Nielsen et al., 2013) or that mixed handed instead of strong-handers were found to be more creative (Shobe, Ross, and Fleck, 2009). Interestingly although hand preference was related to creativity, hand performance was not, suggesting that it is unlikely that there is a neuropsychological explanation for creative performance (Badzakova-Trajkov, Häberling, and Corballis, 2011). Studies which link reported handedness and creativity (Preti and Vellante, 2007) could find a similar relation between hand preference and creative performance but not hand performance and creativity. There have also been findings from meta-analysis of lateralisation and creativity that suggesting it is not necessarily right hemisphere dominance in the brain which causes people to be more equipped to handle creative tasks but hemispherical dominance in general, not specifically associated to one hemisphere being dominant (Mihov, Denzler, and Förster, 2010). There is enough evidence to suggest that handedness or lateralization can affect creative performance, thus collecting data on handedness or ambidextrousness could be useful in order to gain a well-rounded picture of what contributes to an individual's creative production.

There was sufficient evidence to suggest handedness did affect creativity and a question was added to the exit survey which asked individuals to state their handedness. It was in the exit survey as this answer was not likely to be affected by the performance in the tasks. The question asked which was the persons dominant hand and it had 3 options "righthanded", "lefthanded", or "ambidextrous". The large majority or 149 individuals out

of the total 198 answered that they were righthanded, 41 stated they were left handed, 7 whom were ambidextrous, and there was 1 unanswered. The decision was made to create a dummy variable using this information where it was 1 if the person stated they were right handed and 0 otherwise. This takes into account the 1 unanswered but is only likely to cause an underestimation in the effect of the variable. This is because, although it is very likely the person was righthanded, marking them as non-right handed is a way to make sure the effect of the righthanded variable was reliable. It was not seen as necessary to drop all the data from the non-answer but rather mark as non-righthanded as only the people who explicitly stated to be right handed were marked down as such.

3.3.4 Intelligence

Although there is no direct measure of IQ used[14] it is worth discussing the impact of IQ on creativity in order gain insight into what creativity is. The aim of the following section will thus be to discuss how cognitive ability, which is what IQ is a measure of, impacts creativity. If creativity and IQ would be synonymous then it would be easy to say that creativity depends on cognitive ability or the processing power that an individual exhibits. If this is not the case, then it must follow that creativity is not simply a matter of processing power but is a more complex issue. IQ has been linked with creative calibre by defining individuals with an IQ of over 140 as genius; but the view that IQ is analogous to creativity has since been amended and now IQ is thought to measure giftedness and not creativity, at least not one to one (Jon L. Karlsson, 1978, pp. 97–98). There exists a "threshold hypothesis" where it is theorised that beyond a threshold, such as an IQ of 120, there doesn't exists significant increases in creativity as IQ increases beyond the threshold (Runco et al., 2010; Yamamoto, 1964).

However the threshold is not a concrete threshold where there is no increases in creativity beyond 120 IQ points but there is a weaker correlation between creativity and IQ above 120 IQ points than below (Yamamoto, 1964). The relationship between creativity and IQ also depends on the difficulty of the creativity task, because as the task becomes more difficult the threshold for IQ significantly affecting creativity increases (Benedek et al., 2014). In other words the effect of IQ on creativity is stronger for higher IQ levels as the creativity task becomes more difficult, suggesting there is not a rigid threshold but a task difficulty dependent one. It also seems to suggest that there are diminishing marginal returns of IQ in respect to creativity, since the correlation between the two seems to weaken as IQ increases. However the variance between IQ and creativity is very heterogeneous meaning that there is a large variance in creativity at a given IQ level, at low level of IQ

[14] This is due to the measure being very hard and expensive to implement and thus was not controlled for.

creativity is also low but at high levels of IQ all levels of creativity are found (Amabile, 1983).

This suggests that intelligence is a necessary but not a sufficient condition of creativity, i.e. with low levels of intelligence there will be low levels of creativity but a high level of intelligence doesn't mean that the individual will be extremely creative but is likely to have at least average creative ability. This suggest thats creativity to some extent does rely on the processing power of the individual but is only a part of the picture. In the previous section the discussion regarding brain lateralisation showed that creativity is not only a right or leftbrained activity but is likely to depend more on how the two sides communicate between each other. Given the previous creativity best described by not only how quickly or efficiently the brain works around a problem, i.e. IQ, but how the brain utilises the full capacity of the brain, i.e. brain lateralisation.

3.3.5 Language

The performance in the creativity tasks can be language dependent so it is important to take this into account. A question asking the participants to name the postcode they lived in as a child was added to the exit survey. Participants were reluctant to give such detailed information and from the ones that did the information was extremely varied. This made it hard to control for how wealthy the individual's family was directly but did allow to control for the likely first language. Since it was not possible to combine the information into a wealth endowment measure the measurement was instead converted to a dummy variable which was 1 if they were raised in an English speaking country and 0 if they were not. Thus there were some variables which could take into account some of the variability due to differences in upbringing and mother tongue.

3.3.6 Nature and Nurture of Creativity

There has long been a nature versus nurture debate when it comes to fields of research such as athletics and academics, and the field of creativity research is no different. Just like in other areas creativity is influenced by both nature and nurture. When it comes to the genetic or hereditary influences on creativity there is evidence that psychopathology or mood disorders are associated with creativity (Kyaga et al., 2013; Rybakowski et al., 2008). Mental illnesses for example schizophrenia and bipolar disorder have been associated with creativity and along with the previously mentioned, suggests there is an inherited aspect to creativity (Kyaga et al., 2013). Although, except for bipolar disorder, individuals in the creative professions were not more likely to have mood disorders compared to other professions (Kyaga et al., 2013). However psychopathology, whether in

creative or non-creative industries, was associated with creative achievement (Ludwig, 1992), which suggests that creativity or creative traits can be inherited. This is further supported by findings where genes linked to neuroplasticity were found to be associated with psychiatric disorders and musical perception (Ukkola-Vuoti et al., 2013). A systematic review of creativity and psychopathology research also shows support for the positive relationship between creativity and psychopathology with 67.6% of studies finding a positive relation compared to a 9.9% of studies finding a negative one (Thys, Sabbe, and De Hert, 2014). There was also support found for the relationship between first-degree relatives of psychiatric patients and creative occupations (Karlsson, 1970; Kyaga et al., 2013).

Nurturing creativity is also an important aspect of creativity, the physical environment that surrounds an individual affects creativity which is widely found to be the case in management literature (Amabile, 1983; Amabile and Pillemer, 2012; Amabile, 1997; Nonaka and Konno, 1998; McCoy, 2005; Duttweiler, 1984; Chong and Ma, 2010; Oksanen and Ståhle, 2013) and the social environment is an important factor in inducing creativity and creative performance, but also to avoid hindering it (Amabile, 1983; Amabile and Pillemer, 2012; Amabile, 1997; Edmondson and Mogelof, 2006; Hennessey and Amabile, 2010; Nonaka and Konno, 1998). In terms of the social environment a key aspect of inducing creativity is to be in a social environment that supports and encourages risk taking in the context of exploring new ideas (Chong and Ma, 2010). Specifically in the context of problem solving this can be useful since exploring new solution pathways can help in finding new and novel solutions to old problems (Amabile, 1983). Risk taking also mediates the intrinsic motivation on creativity (Hennessey and Amabile, 2010), which adds an indirect effect of a social environment by supporting risk-taking through its effect on individual's willingness to take risks. Psychological safety, the feeling that the environment or team is a safe place for interpersonal risk taking through providing a safe place to express ideas and criticisms and further mitigate risk taking and creative thought (Edmondson and Mogelof, 2006). There is a strong link between social environment and risk taking which is a key constituent of creativity because breaking social norms whether it is through art or otherwise, can be risky.

To advance the thought that where and in what kind of environment a person is brought up influences their creativity later in life one must look at the physical environmental factors in addition to the social factors. Creative students have high energy levels and their underachievement can be minimised when they can be involved and when their physical environment is not too restrictive in forcing them to be inactive for long periods of time (Kim, 2007). The physical space also supports the accumulation of tacit knowledge which is available only to the people working or living there (Oksanen and

Ståhle, 2013). This is exemplified in the theory of "ba" which roughly translates to space, this theory suggests that space, or shared space, be it physical, virtual, and or mental is a foundation for knowledge accumulation (Nonaka and Konno, 1998). This suggests that if, an individual is in an environment which is not too restrictive and in a physical environment which supports the creation of tacit knowledge, it will facilitate learning. Taken at face value this does not seem so relevant in the context of creativity but knowledge has a fundamental role in problem solving (Forgeard and Mecklenburg, 2013) which is an element of creativity (Glover, Ronning, and Reynolds, 1989 p. 5) meaning any increase in knowledge, be it tacit or otherwise, increases creative potential. A similar argument has been put forward by Teresa Amabile in the context of organisations were she found that the presence or absence, depending on context, of salient external restrictions in the social environment can hinder workplace creativity (Amabile, 1983). The argument was that the external constraints would hinder task motivation by crowding out intrinsic motivation which is the motivation that the individual derives from within themselves.

Taking into account the influence of nature through factors like genetics and nurture through its influence on the social and physical environment of an individual it would be fitting to conclude that an individual's family could affect their creative potential both through in terms of genetics and environment. If there was one aspect of an individual to look into to predict how creative they might be, family would be the most fruitful. This could conceivably consider anything from IQ to the learning environment of the individual. This would need far more resources and time to take into account than was available for the research at hand. Even so it does indicate the importance of one's family and family environment when it comes to creativity. Hence there is a dummy which asks if there are close family members who are in the creative industries. It gives an indication about how creatively oriented the family is and so gives an indication about how conducive to creativity the individuals living environment was[15]. The family dummy variable for the individuals was 1 if they had close family who work in the creative industries and 0 if they did not. Close family included uncles/aunts, sisters/brothers, fathers/mothers or first cousins. Admittedly the variable is not fully taking into account the nature or nurture aspect but it is none-the-less useful information to take into account when controlling for individual characteristics. The discussion regarding IQ and Nature and Nurture and their influence on creativity gives a good indication to the complexity of creativity and its constituents. Creativity is clearly a very complex construct and as such motivating creativity can be difficult using a single incentive. It also points to the multiple influences a single incentive can have, as it might motivate individuals to work harder but can also influence

[15] A question regarding and the mental health of family was likely to cause problems when applying for ethical approval and the idea of such a question was dropped.

the environment negatively and crowd-out or negate the incentive to work harder. This is precisely why care was taken when designing the stylised market[16] to take into account the multiple possible effects of the introduction of tournament pay or public information.

3.3.7 Self-Efficacy

Self-efficacy can be defined as the degree of confidence an individual has in their capability to perform a certain task (Balsvik, 2004) so if an individual has a high degree of self-efficacy in the creative domain, they perceive their ability or capability to perform to be high in that domain. The relevant domain of self-efficacy for the research at hand is creative self-efficacy, which is the individuals perceived capability in the creative domain. Creative self-efficacy is not a constant but it is dependent on, and can be influenced by, the environment (Beghetto, Kaufman, and Baxter, 2011) and by creative or domain relevant skills (Mathisen and Bronnick, 2009). This is similar to Locus of control or LoC[17]. Locus of control was also considered to observe how peoples' perception of the effectiveness of ones effort in influencing their environment. Individuals can have an external or internal locus of control, that is to say they can feel as if their circumstances are largely dictated by external forces or through their own decisions, respectively. However self-efficacy is more specific as it can be domain specific and is a closer measure to confidence and perceived ability compared to LoC.

Self-efficacy is relevant toward explaining not only creative behaviour (Lemons, 2011), but creative performance as well (Tierney and Farmer, 2002; Tierney and Farmer, 2011) which is why it is important that it is to consider when attempting to measure the effect of external incentives on creative performance. Could it be that incentives influence creativity differently depending on efficacy? This is especially relevant in a context where there are increased expectations on creative performance. This has been found to decrease creative performance, even though the same study found a positive relationship between creative role identity and creative expectations as well as the enhanced sense of capacity to work creatively (Tierney and Farmer, 2011). This could be explained by findings which suggest that creative self-efficacy is related to job complexity. So if the creative expectations are increased it will not increase creative self-efficacy in a job where creativity requirements are low while it can increase self-efficacy if the jobs creativity requirements are higher (Tierney and Farmer, 2002). This suggests that if people complete a creativity test and be judged based on performance in that test, people who are in a profession that

[16] Described later in detail.

[17] LoC is the degree that people believe they have control over outcomes in their lives. LoC can be either internal or external, where internal LoC means the individual believes they can influence outcomes in their lives and that the control over these situations are internal. While external LoC simply means the person believes that control for the outcomes in their lives exists outside of themselves.

requires high levels of creativity would have a higher creative self-efficacy compared to those in jobs with lower creativity requirements. In turn this suggests that individuals in jobs or studying where creativity requirements higher are likely to perform better. This can be controlled for by eliciting creative self-efficacy scores and also by asking where the individual studies[18]. The institution of study can also influence creativity relevant skills and therefore is important to take into account in its own right independently from creative self-efficacy. Thus the self-efficacy measure will pick up the influence of the institution on self-efficacy. The institution measure will, in turn, pick up any influence of changes in creativity or creativity relevant skills due to institution.

Creative self-efficacy can also increase innovation behaviour (Micheal, Hou, and Fan, 2011), which if someone has been brought up in an environment that fosters creative domain relevant skills, can have a long lasting positive effect of creative self-efficacy (Mathisen and Bronnick, 2009). It can be theorised that upbringing of an individual has an impact on the creative self-efficacy of the individual[19]. Meaning it is important to control for both creative self-efficacy and upbringing. It allows for the direct effects of domain relevant skills, due to upbringing, to be taken into account. The direct effect of upbringing is taken into account using the family members' career choices as a proxy for the creative environment of the individual growing up[20]. The indirect impact of the environment on the creative-efficacy will be considered using the self-efficacy measure as differences in self-efficacy due to environment will be reported in the measure for self-efficacy.

The relationship between extrinsic motivation and creative performance can, at least partly, be explained using creative self-efficacy since monetary incentives have been found to increase creative performance for individuals with a high creative self-efficacy (Malik, Butt, and Choi, 2015). This is a very interesting result since monetary incentives and creative performance have been studied in (Buccafusco et al., 2014) where the authors found that strong monetary incentives boosted creative performance which could also be a function of creative self-efficacy. Self-efficacy affects whether people take part in a task (Bandura, 1977) and so can be a useful measure to gain information about possible differences in effort levels. There were three creative efficacy questions added to the entry survey of the experiment. They were added to the entry survey as there is evidence of the creative task influencing the creative efficacy of an individual. To avoid the tasks affecting the stated creative efficacy all questions relating to efficacy were in a survey which was given to the individuals before they took part in the tasks. Self-efficacy measures

[18]Participants were students the level of creative self-efficacy is more likely to be influenced by the creativity requirements of their study and not their work. In fact it is likely they have not even worked yet.

[19]As discussed in the previous section it also influences individuals creativity and creativity relevant-skills.

[20]The specifics of the dummy "creative family" is considered in the Nature Versus Nature of Creativity section.

for creative efficacy, job-search efficacy, and math efficacy were all added (Bandura, 1977; Tierney and Farmer, 2002; Tierney and Farmer, 2011). Creative self efficacy was added because of its potential to explain creative decision making. The math self-efficacy measure was likely to explain differences in math performance.

3.3.8 Risk Attitudes

Perceived risk can be affected by many aspects such as framing (Tversky and Kahneman, 1986), which is the way that a risky decision is presented to the subject. If a risky decision is framed as a loss people are less likely to choose a risky option compared to a safe option, but if an option with the same risk and expected value of the pay-out is presented in a way that makes the risky option seem like a gain then people are more likely to choose the risky option (Kahneman and Tversky, 1979). What is meant by risk aversion is the willingness to sacrifice an economic payoff in order to avoid a potential loss (Krugman and Wells, 2015, p. 266) while risk loving is the exact opposite, risk neutral is being completely insensitive to risk (Krugman and Wells, 2015, p. 586-87). For example assume a situation where an individual has the choice between either £100 for sure or a 50-50 coin flip where the pay-outs are £0 with 50% probability and £200 with 50% probability. A risk-averse individual would choose the £100 for sure a risk-neutral individual would be indifferent between the two options and a risk loving individual would choose to gamble and get either £0 or £200 depending on the outcome of the coin flip. If the individual is risk-averse they are willing to take a certain outcome that is below the expected pay-out of the gamble, so in afore mentioned case they might accept a certain payment of anywhere below £100 depending on how risk-averse the individual is. Hence risk averseness can be seen as a dependence or a want for security (Szpiro, 1986). If the individual was risk-loving they would be willing to take a gamble with a lower expected utility, but a higher maximum pay out. In context of the afore mentioned case the individual would be willing to take a gamble with an expected utility of anywhere under £100 but a small chance to make a higher gain than 200. Just how much higher the maximum payout, and lower the expected utility of the gamble would be, depends on how risk-loving the individual is.

Understanding risk profiles and how risk is relevant in context of creativity and market output is important in order to fully understand the participants decisions and decision making process. Risk taking is context or domain specific (Ding, Hartog, and Sun, 2010; Weber, Blais, and Betz, 2002) this could be partly explained by risk taking being associated with the differences in an activities risks and benefits and not perceived risk (Weber, Blais, and Betz, 2002). So a professional skydiver could still not invest in a risky asset, even though they in essence take risks for a living, if the benefit from the risky stock

is outweighed by the risks of investing in it. However perceived risk has been found to affect what sort of payment schemes individuals opt into. Overall the more risk averse individuals avoid tournament payment schemes and opt for fixed payment schemes while the tournament scheme attracted workers who believed their performance was high relative to others (Dohmen et al., 2011). The participants will not be able to choose the treatment they are allocated to. This can give risk loving individuals a leg up in the tournament groups while simultaneously cause a decrease in the performance of the risk averse.

Risk attitudes can influence creative performance for a few possible reasons. Risk averse individuals could be less likely to take creative risks which can cause the expressions produced to be bland and uninteresting and so unpopular as well. The assumption being that, there is some risk in going against what the individual might perceive as being a market trend or popular. Even though they might be just as qualified or talented as someone who is risk neutral or risk loving. Conversely the "bland" ideas could also appeal to a common taste which cause the expressions to be popular. Although the previous are possible reactions of the risk averse or risk loving, to the market demands, risk aversion is more likely to affect productivity. This is because, depending on how individuals perceive the situation, could increase the pressure to succeed and thus cause distraction to the market participants. Risk attitude is likely to change type of investment decisions people make or types of gambles they take. Ultimately whether it influences creative performance is dependent on how salient the risk aspect of the stylised market situation is to the participant.

A risk aversion measure used in the regressions shown in chapters 4 and 5 was question number 18 and 19 found in the exit survey[21]. The risk attitude questions in the exit and entry surveys are not identical, although it can be argued they should be. The reason is to make sure the responses were genuine in the exit survey rather than a copy of what the participant remembered answering in the entry surveys. In hindsight there is a low probability the answer would of been exactly the same because the participant remembered what they answered in the entry survey. In addition, the direct comparability of the responses to the risk attitudes questions would have increased the reliability of the risk attitude measurement along with making it possible to observe differences in risk attitudes before and after the tasks. It is also important to either have the probability of the risky options constant and change the expected values or to change the probability of the risky options and keep the expected value the same in order to measure risk preferences. This increases the reliability of the risk preference measure and avoids possible confusion from both probabilities of the options and the expected value of the options changing.

[21] Full surveys can be found in the chapter 3 section of the appendix

Although it can be argued that in question 18, for example, since both the expected value decrease and the probability decrease for option c makes that option very obviously different compared to the other options with the same higher expected value. Thus it can be argued that only individuals who were very risk loving would have selected that option.

3.4 Experimental Design

The effectiveness of IP and TP as a motivator for creativity are studied using an experimental setup mimicking the structure of the markets for creative goods. Expressions produced during the two creativity tests used in the experiment are used as a proxy for production, songs paintings etc., in the market for creative goods. Participants from other groups are asked to give their subjective judgments on these expressions which then dictates the performance of the agent. These subjective judgments proxy demand in the market as individuals largely base their spending decisions on their own subjective judgments. These two aspects guarantee that there is a supply and a demand in the market.

3.4.1 Creativity Tests

The experiments were piloted and there was no evidence of participants misunderstanding the aim of the tasks mentioned or finding the directions for the tasks confusing. This is why there was no practice task during the experiment itself as the directions for the tasks were deemed sufficient during the pilots.

Verbal/Thought

The Unusual Uses Test, similar to the Brick Uses Test created by Guilford, asks individuals to come up with alternative uses for an everyday item such as tin cans or books in order to assess the creativity of the subject[22]. The Unusual uses Test is a part of a wider range of creativity tests called Torrence Test for Creative Thinking or TTCT tests. The tests originally used a scoring system that takes into account originality, fluency, and flexibility used to judge the creativity of answers for figural and verbal and creative tests (Torrance, 1962, p. 238-239). These measures can be combined to create an overall creativity score (Clapham, 1998) which can then be used to compare the performance of the test subjects. However TTCT can be seen as a controversial measure for creativity since it is a divergent thinking test which has been found to test divergent thinking and not creative thinking (M. Baker, 1978). However since 1962 when this test was published it has been improved

[22] An example of what this task looked like in the experiment can be found in the chapter 3 appendix figure A.7

and a review of TTCT tests from 1966 to 1998 found that flexibility, fluency and originality correlate highly with creative performance (Kim, 2006) which means the use the Unusual Uses Test is an appropriate test to measure an individuals.

Figural

The figural thinking task was a "line Meanings task" developed by Wallach and Kogan in their book "modes of thinking in young children" (Wallach and Kogan, 1965, p. 34-6). The participants were asked to come up with meanings for the given line in other words they were given a line or shape and asked what it reminded them of or what it could be a part of[23]. The example given was a horizontal line which then was said to be a side of a flag. For both the creative tasks there was the completion stage, similarities stage, and the favourites stage.

Creativity is judged by two independent and blind judges, meaning they have no connection to the research at hand and did not know anything about who were the participants or which treatment groups they were allocated to. Using two independent judges is common practice when judging creativity for creativity tests, such as, the divergent task (Silvia, Beaty, and Nusbaum, 2013; Shobe, Ross, and Fleck, 2009; Jones and Estes, 2015; Eisenberger, Haskins, and Gambleton, 1999). Thus there exists a robust president of using only a two judges compared to say tens of judge or even more. Both judges received the same rubric for the creativity test which was based on the same theory as the criterion used in the above cited studies. This was created in order to give a consistent base for the creativity scores. The judges also gave subjective scores from 0-5 and were only told to give at least half of the expressions score of 0. This means that it was up to the judges themselves what they wanted to give 1-5 to, the aim of the score was to be purely subjective. These subjective scores could then be correlated to the scores given by the participants to gain some information about how closely related subjective scores might be. These subjective scores given to judges also allowed for the scores between treatments and between groups in the same treatments, to be compared. This was essential to see if there were differences in the perceived subjective quality between groups.

Entry and Exit Survey

Individual differences are controlled for using the information elicited using the entry and exit survey which each participant completes. The survey is divided into two to elicit information about the participants, such as, self-efficacy measures without the influence

[23] An example of what this task looked like in the experiment can be found in the chapter 3 appendix figure A.1

of the results from the experiment. The entry survey includes questions relating to all the measures which can possibly be affected by the participants performance during the experiment. The exit survey on the other hand includes questions regarding variables which do not change due to the experiment, such as age or the year of the degree, or are questions specifically about the participants performance regarding the experiment. These questions are questions concerning variables, such as, performance satisfaction, how much fun the participants perceived having, how fair the reward scheme was, and a proxy for envy.

The measure which acts as a proxy for envy is based on a question which elicits the individual's willingness to trade places given that they would also need to put in the same effort as the person who they would like to trade places with. This is according to a basic definition of envy-freeness where the individual is or is not envious of others given the necessary levels of effort to achieve such position[24]. This is a binary 'would you like to change places given the effort the other person made' yes or no.

The questions for reward fairness, performance satisfaction, and fun are more straightforward. They exist simply to gauge a subjective feeling which can be used to compare overall differences between treatment groups or between high and low performers, for example. How satisfied was an individual with their performance from what is essentially a scale from 1 to 6, ranging from very unsatisfied to very satisfied. This can be simplified into a satisfied or unsatisfied but for a more nuanced observation it has 6 options with a forced answer, meaning to option to answer 'I don't know'. The same scale is used for the scale of reward fairness ranging from very unfair to very fair. The final subjective judgment question was, on a scale of 1 to 10, how much fun did you have from 1 being 'no fun' and 10 being the highest amount of 'fun'. These questions can seem inconsequential but inform differences in the perception of the environment present in the different treatment groups and what this perception might be dependent on.

Questions regarding age, university experience, gender, and hobbies are included in the exit surveys. These are relatively standard questions present in surveys tied to experiments as they can dictate things like maturity or experience both in life and in art which can influence the performance of the individual. There is a question about what hobbies participants have which is divided into two dummy variables 'sports hobby' and 'arts hobby'. The intuition here being that the more practice individuals have. i.e. if they have an arts related hobby, the more creative a person could potentially be. The 'sports hobby' variable was included because some studies link physical activity with increased cognitive performance and a reduction cognitive decline (Wang and McClung, 2012; Ruthirakuhan et al., 2012). Since creativity is also closely linked with cognitive

[24]This was originally introduce in gamov and stern 1958 book of math puzzles

performance it makes sense to add the question to observe if it can explain variance in creative behaviour.

3.4.2 Lab Setting & Artists Participating in the Market

The computer labs used for the experiments are located in the main campus of the University of Glasgow and data stored and backed up of University servers. The computer labs used had dividers constructed from cardboard to fit the specification of the computer lab in use. The participants were isolated into cubicles and their line of sight is obstructed in the front and in the sides to protect the screen of the participant and in order to reduce possible distractions. This is important in order to decrease the possible differences between sessions. There were 8 sessions ranging from 20 to 34 participants, lasting anywhere from 1 hour 20 minutes to 1 hours 40 minutes. Session dummies were used when regressing the results in order to take into account any remaining variation between sessions which could result from anything from weather to time of year.

The artists in the experiment market are art students, in total 198, from Glasgow School of Art, The Royal Conservatoire, and the Arts Department at the University of Glasgow. Participants were recruited from art schools to recruit a population of participants who would have a high probability to use or be in contact with copyright or in copyright industries in the future. Art students were used in order to maximise external validity of the results when comparing the sampled population with the population of individuals who use or are affected by copyright. This is in order to address the possible differences between populations of artists to non-artists as theories suggest these two populations could be significantly different (Abbing, 2011, p. 89-91,115).

The participants are a mixture of art students and so the participant population is designed to mimic the artist population as a whole. The implicit assumption is that art students are more likely to become artists involved in the market for creative goods. In addition there is a possible difference in how artists, compared to the overall population, respond to the incentives present in the markets for creative goods as it could be the incentives themselves which drive individuals to be a part of the market for creative goods. Thus the focus of the study was not a subset of artists but artists more generally.

3.4.3 Structure

Before the experiment even starts everyone reads the plain language statement and signs a consent from. This is followed by an introduction session where all individuals introduce themselves and say a bit about themselves, what they study and why. Next the

participants walk into the lab and sign in to the system. After which they start the experiment itself, order found below. In each of the two creativity tasks there is three stages. Stage 1 is the Creation the Market, stage 2 is the rights enforcement, and stage 3 is the popularity decision & results. Each participant is informed about the experiment structure in the experiment instructions, before the first task i.e. first creation stage begins. This means that individuals are aware of all relevant information [25]. The complete structure is as found below.

3.4.4 Creation in the Market

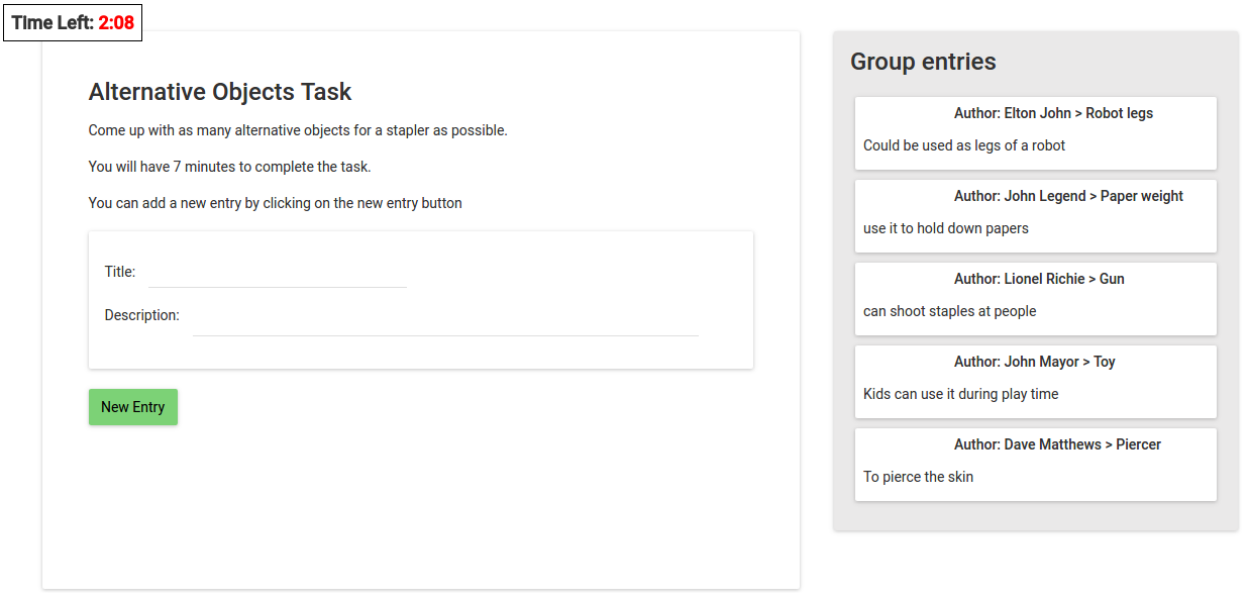


FIGURE 3.1: Screen Shot of the Divergent Task with Attribution

To simulate creation in the market there are two creativity tasks. The two creativity tasks are a divergent thinking task called the 'Unusual Uses Test' or the 'Alternate Uses Test' (Torrance, 1962, p. 238–240). It was developed by the well-known psychologist J.P. Torrance and the second of the two "Line Meanings Task" developed by Wallach and Kogan (Wallach and Kogan, 1965, p. 34-36). Both tasks are mechanically similar, participants are asked to create ideas/expressions based on a stimuli presented. The difference between the tasks is that the "Unusual Uses Task" is a divergent thinking task, while the 'line Meanings task' is a figural creativity task. The two tasks are chosen in order to incorporate different types of creativity and creative production into the experiment. Below is a screenshot which shows the screen of participants completing the divergent thinking

[25] pay structure, information available about the performance of other participants, and the risks of creating an idea which is similar to any existing entry, observable during the creation stage.

task in the condition with public information[26]. On the right is the list of already existing expressions and on the left the area where to submit new expressions (Torrance, 1962, p. 238–240; Wallach and Kogan, 1965, p. 34-36). It should be noted that in figure 3.1 the screen shot says '7 minutes per task', this is a misprint and it was made clear that the tasks were 5 minutes long and instructed to view the countdown clock found in red in the top left corner to see how much time they had left.

Structure of Experiment

Plain Language Statements and Consent form.
Introduction session
Lab Introduction and Entry Survey
Experiment Instructions
First Creativity Task
1. Divergent Task Instructions
2. Divergent Task
    A. Creation the Market Stage (Task)
    B. Rights Enforcement Stage
    C. Popularity Decision
    D. Results

Second Creativity Task
1. Figural Task Instructions
2. Figural Task
    A. Creation the Market Stage (Task)
    B. Rights Enforcement Stage
    C. Popularity Decision
    D. Results

Math/Control Task
1. Math Task

Instructions
2. Math Task
    A. Task Itself
    B. Results

Exit Survey

[26]The screen does not look different depending on whether participants are in the tournament pay group or not.

3.4.5 Rights Enforcement

After completing the task, the expressions generated by a group are sent to another randomly generated group whose ideas are in tern sent to a randomly selected group. This is done so that every groups expressions are judged by another group. Individuals in the groups are then asked to identify any two expressions they deem to be similar[27]. The participants are given instructions how to judge similarity and are primed into a copyright frame i.e. the directions on how to judge similarity is modelled on how infringement of copyright is worded and defined. If an idea is judged to be similar to another already existing idea, by at least two judges, then the idea which was created last will be discarded i.e. only the original remains. The similarity judging is completely anonymous and does not affect how each individual's expressions are judged by others. This is common knowledge for all participants. The creators of the ideas do not know which ideas were voted as similar and discarded.

3.4.6 Mechanism of Deciding Popularity

The pay an individual receives in the TP conditions is dictated by the popularity i.e. the amount of stars a participants ideas receive in the final stage of each creativity task. The pay structure for the TP group, shown below, is created in order to simulate the winner-takes-all pay structure in creative industries, such as, music and book publishing (Abbing, 2011; Kretschmer and Hardwick, 2007; Kretschmer, 2012, p 113). It should be mentioned that the below structure is more equally divided compared to the winner-takes-all pay structure found in the book or music industries. This is in order to make recruiting easier. If the pay structure strictly mimicked the pay structure of the creative industries then it is likely it would of been difficult to recruit for the later sessions as individuals could have deemed it too unfair or too risky to even take part.

Pay Structure

1. £5.55
2. £2.1
3. £1
4. £0.5
5. £0

[27] If none were deemed to be similar no expression pairs would need to be submitted. There was no upper or lower limit to how many pairs would be submitted

The minimum guaranteed earnings is £3 and participants in the TP groups could earn a maximum earnings per task of £5.55 and in total £5.55x3+£3 =£19.65. Non-TP groups were all paid a flat fee of £8.49 which included the guaranteed £3 for participation.

There is a final task, math task, where participants are asked to solve as many addition problems, of the 30 presented, as they can in the 5 minutes given. The problems were simple addition problems which had 4 numbers which range from 1-15 and the participants simply added them up. Each correct answer gave the participant a point and the participant that got the most points or a certain number of points the fastest was judged to have performed the best. The point of this task is to judge differences in effort between treatment groups. The task can also be used as a control in order to observe how the two creativity tasks might be similar or different to the control task[28].

3.4.7 Measuring Creativity

If creative performance is to be measured it also has to be judged, which could cause some problems. This is because whoever is judging the creative performance or output might have different idea of what is "new", "novel", "original", or "unique". In fact, the difficulties caused by defining and measuring uniqueness, novelty, or originality of ideas has influenced creative task performance to be assessed using (only) fluency or the number of expressions. However an alternative could be using an external rating procedure with trained raters (Fink et al., 2007). Using only fluency or productivity as a measure for creativity can be problematic because it might not be a comprehensive enough measure of creativity on its own to include enough different factors which makeup creativity. The goal of the creativity tests as a part of this study is to include several different measures of creativity with and trained raters/judges to rate the creative product of participants. The alternative uses test participants are asked to list different uses for everyday items, such as a brick. Judges then rate the expressions submitted by the participants based on fluency, flexibility, humor, and originality. Fluency which is the number of different relevant answers, flexibility which is the amount of different answer categories used, and originality which is the number of rare relevant ideas were used to asses creativity of products in the alternative uses test (Clapham, 2010; Torrance, 1962, p. 239). Humor was also added because it has been used as a rating category by previous research and is especially relevant for the research as humour is likely to be widely used by participants (Kim, 2006). This type of measuring system would be more convincing because it takes

[28]For example, if handedness preferences influenced performance in one of the creativity tasks and the math task, it could be concluded that these two tasks could have some similarities in the way the participants approached the tasks. Other existing data could then be used to strengthen or discard the theory.

into account a larger amount of categories which creativity could be affected by, and not only, for example, fluency or the amount or type of ideas.

Fluency represents the number of ideas or responses the participant has come up with. Flexibility is the ability to generate ideas from different categories and from different points of view. Originality is the ability to generate ideas away from the obvious and common place. Lastly humour is simply a score given for any idea which was judged to be humorous according to a given definition[29]. The author has used a subjective measure of novelty compared to a more commonly used statistical rarity measure to measure originality [30].

Fluency, flexibility, and originality are shown to have a significant link with creative performance (Torrance, 1962, p. 214-216) as well as creative performance later in life (Kim, 2006). Similar methods for measuring creativity to the ones detailed above is used in a wide range of studies on creativity (Fink et al., 2007; Runco et al., 2010; Runco and Albert, 1986; Charness and Grieco, 2014; Moore et al., 2009). Humour as a criterion was added in order to capture a the effect of the technique or tool often used in the creative industries. The measure has also been mentioned as a measure of creativity in a paper exploring expansions to the traditional TTCT criterion (Kim, 2006).

What type of judge it is also matters as there has been found to be a significant difference between expert and non-expert judges (Cropley and Kaufman, 2012; Hekkert and Wieringen, 1996) and experts scores have been found to correlate strongly between one another (Hekkert and Wieringen, 1996) which means that expert scores can be compared with each other more effectively. Some variation has been found between experts and quasi-experts (Hekkert and Wieringen, 1996) the evidence was not strong enough to suggest using quasi-experts compared to experts even though it would be less expensive since the variance in rating of quasi-experts was too high. This would make it hard to compare scores between judges and thus also between different scores given in different tests. Thus all the final expressions from all of the sessions were judged by individuals from the creative disciplines in order to have the results be comparable between judges and between conditions. This also allows for the judging or the expressions to happen closer to how it might happen by "gate keepers" in the market. These are individuals who make the best-newcomers lists or are critics, for example.

The combined score given by the judges is the creativity score given to the ideas. With the creativity score individuals and treatment groups can be compared between each other in terms of creativity. The judgment criterion will be similar for both tasks and

[29]Definition found in the appendix section "Creativity Instructions"

[30]The specific instructions can be found in the appendices added at the end of the paper

so it could even be possible to compare the overall scores between tasks. The only difference between the scoring criterion will be the categories used in the flexibility score, for both tasks there will be 7 categories however these categories will be different and so not directly comparable. All other criterion will have the exact same wording and the criterion which can be directly compared between each other. Judges were also asked to submit a subjective judgments of all the ideas from both tasks by giving them anywhere from 5 to 0 stars. Subjective judgments have been forwarded as an alternative to creativity measures (Silvia et al., 2008) and so one has been added to complement the more formal creativity score. 0 stars are given if an individual does not like the idea and anywhere from 1-5 starts were given if they liked the idea. The more stars an idea was given the more the judges liked that idea. They were told to leave at least half of the ideas blank or with 0 stars.

TABLE 3.2: Inter Rater Reliability

	First Rater DT	First Rater FT
Second Rater DT	0.8104	
Second Rater FT		0.8321

The score is from 0 (low inter rater reliability) to 1 (high inter rater reliability). DT is the divergent task. FT is the figural task.

The Cronbach's alpha is a measure or a coefficient of consistency/reliability. Cronbach's alpha is measured using the number of observation compared between raters, a measure of the variance between the scores given by the two raters and an inter-item covariance measure. The measure gives a score between 0 and 1 where 1 is perfectly identical data and 0 which shows no similarities between the data points compared[31]. Both the correlations and the Cronbach's Alpha are high when comparing the creativity ratings given by the two raters, as indicated by the correlations in table 2 and Cronbach's Aplha in table 3. Importantly the Cronbach's Alpha scores were above 0.7 and below 0.9 which is high enough for the score to be reliable but low enough to show that using multiple raters was not redundant (Peterson, 1994). The scores indicate that the reliability between and of the raters in rating creativity according to the rubric given. Thus, indicating the overall reliability of the creativity score used to judge creativity. Subjective judgments had lower correlations but were also based on personal judgments and not a rubric which is likely the cause of the lower correlation between subjective scores.

[31] Cronbach's alpha is measured using the following formula $/alpha = (n * C)/(v + (n-1)C$.

TABLE 3.3: Cronbach's Alpha

	First Rater DT	First Rater FT
Second Rater DT	0.8871	
Second Rater FT		0.8934

The score is from 0 (low inter rater reliability) to 1 (high inter rater reliability). DT is the divergent task. FT is the figural task.

3.4.8 Limitations and Improvements

The number of participants is a common constraint in experimental research and in the case of the research presented was an especially restricting as the minimum participant number per session was 20 and the pool of participants was arts students only. In future experiments it would be interesting to add non-arts students and see if the environment or the pay-per-performance influenced the two groups differently. Switching the order of the tasks would is also an improvement which can be added to future research. This would allow for a clearer picture of the effect of the market feedback, however this is something that would need a larger participant base to implements and as such was not implemented in the experiments. This would also allow for a clear distinction between the two tasks and how external motives influenced the two tasks.

It could also be interesting and useful to add some measure of what a participant's intrinsic motivation for the type of tasks present in the experiment. This would allow for a more specific interpretation of effects. Pay can also be altered to be higher and/or more unequal thus mimicking the pay structure of the creative industries more accurately, however this can be very expensive. The effects of attribution could also be strengthened by having participants be split into groups and then asked to introduce themselves and talk a bit about their interests etc.,in the same groups in which the participants complete the task. Allowing participants in each group to be more familiar with each other before the task thus making any effects from attribution stronger.

Given the complexity of the programming the program was an absolutely essential and fit for purpose too for the study. It was compiled using state of the art coding techniques especially on the back end[32] and was improved to the point that it ran instantly and without hesitation even when the amount of data at the end of the experiment was

[32]Programs such as the one used in the experiment include a back end and a front end. The front end is the user interface which the participants can observe and the back end is the part of the program which communicates between the computer used by the participant and the server which compiles the data of all participants taking part in the experiment.

very large. This being said there are some details regarding the experiment and the program itself which ought to be discussed. Firstly the procedure can be improved by adding a forced answer to all survey questions in order to receive fuller data. Although the data did show significant results it is imperative that the data gathering process is as good as can possibly be to maximise the amount of data available. It would also be good to add extra information for each question so that if individuals had a question about the questions asked they could consult this information thus speeding up the survey completion process. The math section have had either harder questions, of more of the simpler questions as the top end of the math performers was condensed and cut off at the maximum of 30 questions answered. Both of these improvements would increase the quality of the data.

The rank for the experiment was automatically calculated by the program based on the performance of the participant in each task. In the two creativity tests the performance was calculated based on how many favorites the individuals received and if they received the same amount the participant who received the larger number of the larger favourites would receive the higher rank. The program did not use the full array of favourites given but a random subsection of the favourites given. This cause some individuals to receive a rank which was not the correct rank based on all the favourites given. Because the subsection of favourites used by the program was random there was no systematic bias in the rank calculated by the program. This caused the rank signal not to fully reflect the total amount of favourites given. However there is no evidence of the difference in actual rank and given rank causing any differences in the way participants acted[33] and thus this calculation error did not cause biased results. The fault was only found after the experiments were fully conducted and the fault was not noticed during the pilot sessions or any of the experimental sessions, which would indicate this was not an issue for participants at any point of the experimental process. Statistical analysis of differences in performance/behaviour between the participants who received the correct and incorrect ranks, concluded that this mistake did not have consequences for the reliability and quality of the data. This was not a problem for the math task where the ranks were based on the number of correct answers given and the speed at which they were given.

3.5 Conclusion

The methodology used is designed to amalgamate a combination of arts research, psychology, law, cultural, and economics research in order to gain insights into how creativity is influenced in a market environment. The methodology is perhaps closest to the

[33] Full calculations and working can be found in the appendix for chapter 3.

methodology used in experimental economics although the background literature on creative markets derives largely from law, arts, cultural economics, and economics of law. Existing literature on the subject of creative markets is very comprehensive especially when outlying the market structure and the power dynamics within the market between different actors. However there exist a gap where the effects of incentives within the market for creative production are not fully understood. This gap in understanding is the inspiration for the methodology described in this section. There exists creativity research and market research separately, as detailed in the literature review section, but little research on how market incentives and the market environment. Thus the methodology combines the tests for individual creativity with the incentive structures in the markets, along with controls, to observe the impacts of varying market environments which are influenced by copyright.

The creative process is extremely multifaceted and is not like any other production process, even compared to other winner takes all markets. This is where psychology literature contributed a large portion of research on the impact of different variables, such as handedness or risk-attitudes, on creativity. The information in turn helped to sculpt the two surveys used to control for as many variables regarding individual differences in creative potential. Insuring the quality of the surveys helped to compare each individual on a level basis taking into account individual differences in creative potential. This allowed for each individual to be compared on a level basis, when interpreting the impacts of environment, on the overall production of creative output along with the impact of different individual characteristics in varying market environments.

Admittedly the research subject of creativity is largely subjective and the measuring of creativity is itself subjective. This however does not mean that the methodology cannot produce reliable research. Rather this means that the results presented in the next chapters will need to be analysed in context of existing literature and corroborated with future research in order to gain a fuller understanding of the impact of the market environment on the creative process. Although the methodology will not create results which can, on their own, be used to inform policy the methodology will contribute to furthering the understanding of creativity and how the market environment influences it. The new methodology does help to fill a gap in existing creativity research and the results produced are both novel and able to be interpreted. Importantly this is the case in context of existing literature regarding creativity, copyright incentives, and market structures of markets for creative goods.

Chapter 4

Creative Output in a Market Context

4.1 Introduction

This section will focus on the analysis of market mechanics in the creative markets and their affect on output, creativity, and the subjective performance individuals of this output in varying market settings. The analysis will be in context of the economic effects of the market mechanics in the creative markets with discussion about the impact of copyright law on creativity. As discussed previously the set up of the experiment is mimicing the creative markets specifically to gain insight in to how attribution and economic rights , i.e. public information and tournament pay, influence creativity with a focus on the possible effectiveness of these rights on promoting creation and creativity. Thus the focus of this chapter will be the economic analysis of law and how the treatments influence performance in general and the next section will then focus on individual characteristics and how these interact with the treatments.

The aim of all market participants is quite straight forward, make as much money as possible. Competition thus exists between creative and non creative markets where different entities, such as, restaurants, nightclubs, and movie theatres compete in order to maximise the total amount of disposable income spent at their establishment or on their songs etc. Thus in reality the creation process within a creative industry can be dynamic process where the size of the market which producers are competing in can expand or contract depending on the relative demand or attractiveness of this industry or market to the consumer. However to simplify the market setting the assumption is made that the market value remains constant and only the rank within the market determines ones payoff. This is to say that participants in one creative market are not competing with participants in another creative market or any other market competing for disposable income spending in order to maximise the total demand both personally and indirectly of the market they operate in themselves. This can be argued to not be realistic as there needs to be some base level of quality compared to other competing sectors in order gain any demand. It could be that the overall industry/market product is so poor that

no one would demand it. This criticism would be true, but the point of the research is not to observe the overall market size of the creative markets given varying amounts of public information, or the existence of tournament pay or not, but rather to observe if production within that industry is higher or lower given the existence or lack of such motives. Although it can be an interesting angle to observe as thee incentives largely exist in order to keep the arts and creative industries alive, i.e. the existence of copyright to motivate creation. Such arguments were discussed in terms of the justifications for copyright when the first copyright laws were being created.

The market participants/creators have two avenues which they can compete in, the number of units produced and the quality of those units which are produced. The creators cannot succeed without having some of both, that is to say even if a creator had an infinite amount of output, if the quality of this output was non existent then they would not perform well in the market, visa versa. Thus the strategic decision making of the creator is confined into manipulating these the ratio between the two to find the most effecive ratio for maximising market success. It is worth mentioning that advertising or promotion could play a role as a third variable when observing the market for creative goods as it can influence the creation of a fad and thus increase demand for a particular artist even though the quality of the work might not otherwise attract such demand. This exists in the music, book, and visual art industries and is used in order to signal quality to the consumer in order to increase demand (Caves, 2002, p. 47-48, 151, 288). However the only signal of quality in the stylised market is the work itself and is akin to the small scale producer of creative goods as they do not have the resources to promote. To a large extent this is who copyright law, and the incentives of public information and tournament pay within it, are designed to induce to create as most creators in the industry can be considered 'small scale producers'. This is because of the tournament nature of the market, where the median market participant is likely to earn far less than average wage both in the creative industry they take part in and compared to other jobs outside of the markets for creative goods (Abbing, 2011, p. 113; Kretschmer, 2012; Kretschmer and Hardwick, 2007). Thus this simplification of competition to only on quality and quantity can be argued to not abstract significantly from the reality of most artists.

In the next sections the regression model used to analyse the results of the experiment will be introduced followed by the results section. This section includes a histogram detailing performance separated by treatment group for the variables of interest. These variables are output, which is the total number of creations in both creative tasks. Creativity overall and creativity per idea for both tasks and an overall subjective score and a subjective score per idea. The results are organised into totals and per idea in order to observe the overall impact of the treatments on creativity and subjective scores along

with the average quality of the product in each of the treatments. The subjective scores are simply to supplement the creativity scores and also function as a type of check on the overall quality of the judges scores. If the judges subjective scores did not correlate with the subjective scores of the 198 participants then it could be argued that the judges did not put in adequate effort, or are not suited to judge creative output, as their judgments deviate so strongly from the overall judgments of others. However since there is strong correlation between the subjective judgment of the paid judges and the experiment participants there is no evidence of negligence or laziness on the part of the judges and so their scores, according to this check, are reliable.

There is also a third task which is a control task where the participants were asked to complete 30 math questions. This is designed to observe some baseline effort levels between groups which can give some information about how exactly the participants have responded to the incentives. The regressions are separated into two groups, one where all participants are taken into account and one where only participants with less than 30 total solved answers were observed. This is designed to observe if there are any patterns of behaviour which are not as easily observable with all participants taken into account. There is a relatively large number of observation with 30 solved and this causes the data to have a sealing and can make it harder to observe patterns in the data. Restricting the data to the individuals who did not complete all 30 questions cuts out of the upper part of the distribution which is capped at 30 and thus dampens some of the patterns that can otherwise be found in the data and makes it easier to find potential differences in the patterns of the data between the treatments.

4.2 Regression Model

The general form of the OLS regression, as seen below, takes into account differences between individual factors and sessions. An OLS was used as wider range of variables could be used in comparison to an ANOVA. It also allowed for the use of multiple dummy variables to be used without larger complications on the reliability of the results which an ANOVA might bring if multiple dummy variables are used. The individual treatment groups are public information only (PI) only or $\beta_1\delta_i$, tournament pay (TP) only or $\beta_2\eta_i$, and the combination of both (IP & TP) or $\beta_3\kappa_i$. The OLS includes a matrix of controls for individual differences $\beta_4 C_i$ and the matrix of session dummies $\beta_5 S_i$. All dependent variables were logged in order to reduce heteroskedasticity and to maximise estimation accuracy.

$$y_i = \alpha + \beta_1\theta_i + \beta_2\gamma_i + \beta_3\kappa_i + \beta_4 C_i + \beta_5 S_i + \varepsilon_i$$

When Regressing subjective scores the better suited OLS model was to treat each treatment group individually. Thus there is no interaction affect but rather shows whether each individual treatment group is significantly different from the control group. This type of OLS does not show information about possible cross effects, which is possible using an OLS with an interaction, however it was found to give more reliable results compared to using interaction effects which returned results which did not correlate with the data.

The dependant variables were logged so that the problem of heteroskedasticity was minimised which in turn decreases standard errors in the regressions. When the dependent variables were not logged the results did not reflect the changes in the means accurately and in some cases returned non-sensical results, even when the dependant variable was only regressed against the treatment dummies on their own. This points to potential problems where the OLS specified is not accurately estimating patterns in data. [1] Thus the decision was used to use logged dependant variables and dummies for the individual treatment groups along with the session dummies and control variables for individual characteristics.

The regressions shown in the paper are not taking into account the rank or performance in previous task. Taking into account rank could be used as a way to take into account changes in performance due to the rank observed in the previous task as individuals could loose motivation as they received a rank lower than expected. The performance in the two creativity tasks is strongly correlated and thus adding a rank variable would also change the regression to show differences in how individuals changed their production from one task to the other in the different treatment groups. In this chapter each regression demonstrates the difference in performance between treatment groups for each task separately. Compared this to differences in how people would react differently from one task to the other between treatment groups and it becomes clear that adding a variable for rank would change the interpretation of the regression to a significant degree, which is why these regressions are not included.

Results will be shown in a histogram which depicts the averages for the dependant variable for each of the 3 treatment groups and the control group. If there are significant differences they are shown using stars and the key found in the description of the histograms. The tables associated with the regressions shown in the diagram are added to the two regressions associated with each histogram. All differences between the treatments are added except for the differences between the two PI groups as there is little

[1] This can be due to many reasons but is likely due to heteroskedastisity in this case, as the estimation given by the OLS using logged dependant variables returned results which correspond closely to the changes in the means between treatment groups.

difference between the means generally and no statistical differences between any of the two PI groups[2].

4.3 Results

The interpretation of results is relatively straight forward as the dependent variable is logged but none of the independent variables are. Thus the coefficients show the impact of each independent variable in percentage terms, i.e. if the coefficient is .1234 for example would indicate a 12.34% increase in the dependant when the independent variable increases by one unit. The controls for individual differences will be added but the interpretation of those results will be left for the next chapter. In this section close attention will be paid to the results in order observe any possible differences in overall quantity and quality measures and using these measures to gain insight into participant decision making between treatment groups. Particular attention is paid to the potential for the quantity quality trade-off between the overall creativity or subjective score, i.e. quality, and the number of ideas produced in each task, i.e. quantity. These will be compared to the results of the control math task which can give some insight into why there might be differences in how individuals perform between treatment groups but also between tasks. If there are differences in how individuals react to incentives in different tasks why might this be, are some tasks similar to each other which might explain this? The control task can be used to help answer these questions by comparing the performance in the control to the creativity tasks to see if there are similarities in how participants perform in these tasks.

4.3.1 Descriptive statistics

The following is a general overview of the variables being used in the regression. 4.1 shows the range of each variable and a short hand for the interpretation of the variables low and high bound. The majorty of the variables are dummy variables with a 0 or 1 value or a no or yes answer respectively.

[2]This can be checked in the appendix.

TABLE 4.1: Ranges of Control Variables

Variable	Range	Low Bound	High Bound
Male	0 or 1	No	Yes
Creative Efficacy	0 to 100	No Efficacy	Full Efficacy
Creative Family	0 or 1	No	Yes
English Speaking	0 or 1	No	Yes
Risk Aversion	1 to 4	Risk averse	Risk Loving
Ambiguous Risk	0 to 100	Risks 0%	Risks 100%
Right handed	0 or 1	No	Yes
Famous	0 or 1	No	Yes
More in Creative Fields	0 or 1	No	Yes
Arts Hobby	0 or 1	No	Yes
GSA	0 or 1	No	Yes
Age	0 to 45	18	45
Math Efficacy	0 to 100	No Efficacy	Full Efficacy*

If no it means that the value reported for the dummy was 0 or not true. For example, if 0 for male it means not make or if 0 for Arts Hobby then person did not have a arts hobby. * Math Efficacy is only used in chapter 5.

Table 4.2 shows the mean values for all the control variables. The means are given for each treatment group and overall to give a general idea of the distribution of participants between treatment groups. There were more males randomly selected into tournament pay groups compared to non-tournament pay groups. There also seems to be fewer native English speakers in tournament pay groups. Excluding the distribution of males and possibly native English speakers the distribution of participants between groups is relatively even. The variable for males and native English speakers are controls and even though there is a difference in the distribution between treatment groups any effect this might have will be taken into account in any regressions presented.

The dependent variables are continuous variables as observed in table 4.1 and some values are 0. This causes problems when using a log transform as the log transform would not be able to deal with the 0 value and thus the observation would be lost. This is why 0.00001 was added to each value in order to keep the relative values between observations essentially the same. This allows for all values to be added into all regressions thus maximising the number of observations in each regression.

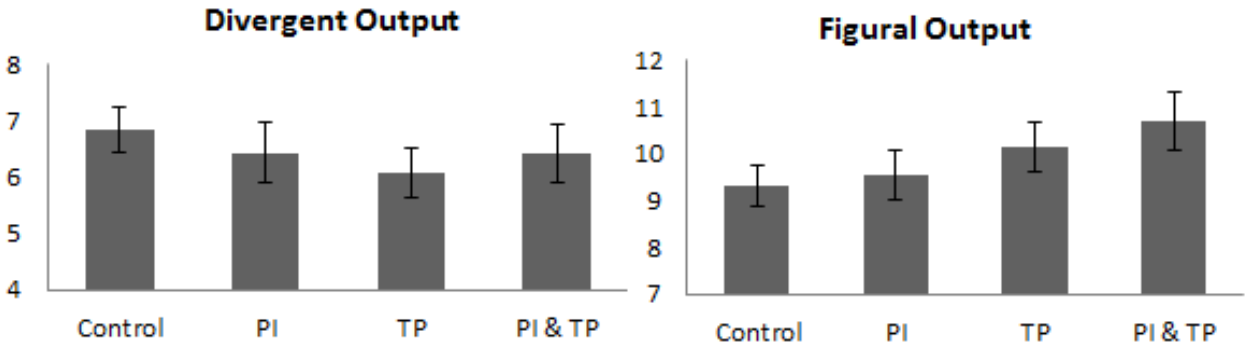
TABLE 4.2: Descriptive Statistics for Controls

Variable	**Control**	**PI**	**TP**	**PI & TP**	**All**
Male	0.226415	0.204082	0.34	0.355556	0.279188
Creative Efficacy	70.66667	71.2585	73.34667	70.62963	71.48562
Creative Family	0.415094	0.44898	0.34	0.311111	0.380711
English Speaking	0.566038	0.571429	0.48	0.488889	0.527919
Risk Aversion	2.716981	2.387755	2.92	2.888889	2.725888
Ambiguous Risk	38.39623	34.65306	26.3	35.77778	33.79695
Righthanded	0.679245	0.795918	0.76	0.777778	0.751269
Famous	0.660377	0.571429	0.48	0.577778	0.573604
More in Creative Fields	0.792453	0.714286	0.82	0.8	0.781726
Arts Hobby	0.660377	0.693878	0.5	0.644444	0.624366
GSA	0.45283	0.469388	0.48	0.422222	0.456853
Age	22.20755	20.71429	22.32	21.02222	21.59391
Math Efficacy*	41.35849	42.77551	37.78	40.51111	41.35849

Mean values for all control variables used for all regressions for chapter 4 and 5. * Math Efficacy is only used in chapter 5.

4.3.2 Number of Ideas Produced

FIGURE 4.1: Output for the Two Creativity Tasks



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in tables 4.3 and 4.4 below.

The only directly incentivised action is to create as many expressions which gain as many stars as possible. In other words to maximise the overall popularity of their ideas. The

generation of ideas on its own was not directly incentivised by the market, rather it was indirectly incentivised as each unit of output increased the potential to maximise ones popularity and thus their chance of success. In the divergent task the highest average number of ideas was in the control group, as figure 1 indicates, however only one of two regressions indicated a statistically significant difference between the control group and the TP only groups at 5% sigificance level. This difference was estimated at 26.1% fewer ideas in the TP only treatment compared to the control group, as seen in table 4.3. In the figural task there was a steady increase in the number of ideas but no significant differences between individual treatment groups. There was a significant difference when comparing all groups with tournament pay to all groups without. This difference was estimated to be 9.7% at a 10% significance level, as seen in table 4.4. Thus there is a significantly lower production in the TP group only for the divergent task but an increase in production for TP groups overall in the figural task. This suggests there could be differences in how individuals react to incentives which is dependent on the type of creativity task.

TABLE 4.3: Regressions Differences in Output Between Treatment Groups Control Included.

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	-0.139			-0.191	-0.004			0.010
	(0.126)			(0.152)	(0.092)			(0.086)
TP		-0.261**		-0.230		0.061		0.068
		(0.113)		(0.147)		(0.079)		(0.075)
PI & TP			-0.503	-0.417			0.135	0.143
			(0.358)	(0.345)			(0.087)	(0.093)
Obs.	102	103	99	197	103	103	99	197
r2	0.220	0.331	0.328	0.160	0.199	0.204	0.214	0.132

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression

TABLE 4.4: Regressions Differences in Output Between Treatment Groups and PI and TP Overall, Controls Included

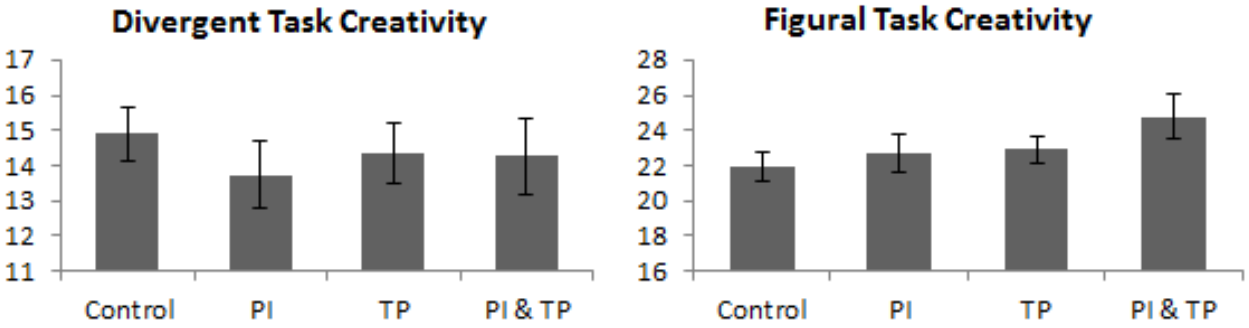
	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	-0.191				0.043			
	(0.201)				(0.064)			
Overall TP		-0.230				0.101*		
		(0.176)				(0.059)		
PI v. TP			0.166				0.012	
			(0.137)				(0.079)	
TP v. IP&TP				0.209				0.054
				(0.358)				(0.097)
Obs.	197	197	99	95	197	197	99	95
r2	0.150	0.153	0.335	0.231	0.115	0.127	0.331	0.166

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. PI) and tournament pay (i.e. TP) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

4.3.3 Creativity Score

Overall there is little evidence of overall creativity being affected by the treatments. There is some evidence that in the divergent task there is lower overall creativity in the TP only treatment group with an estimated 15.7% decrease in creativity at a significance level of 10%, as table 4.5 indicates. However this was when the TP only group was compared to the control directly. When dummies for the two other treatments were taken into account this effect became insignificant, indicating a void of significant effects. In the figural task there was no evidence of a significant difference between any of the treatment groups. Although it should be mentioned that the overall creativity is increasing similar to the increase in the number of ideas created in the figural task. Thus there is some indication that the increase in average creativity in the figural task is powered by the increase in the number of creations/ideas. No such patterns are observable in the divergent task although there is a higher overall creativity in the control group compared to other groups, even though none of these differences are statistically significant.

FIGURE 4.2: Total Creativity Scores for the Two Creativity Tasks



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in table 4.5 and table 4.6 below.

TABLE 4.5: Regressions Differences in Total Creativity Between Treatment Groups, Controls Included

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	-0.136			-0.199	-0.011			-0.005
	(0.119)			(0.150)	(0.074)			(0.070)
TP		-0.157*		-0.135		-0.033		0.046
		(0.094)		(0.141)		(0.063)		(0.060)
PI & TP			-0.502	-0.423			0.0101	0.106
			(0.382)	(0.363)			(0.076)	(0.078)
Obs.	102	103	99	197	102	103	99	197
r2	0.194	0.334	0.310	0.149	0.196	0.136	0.178	0.110

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression.

TABLE 4.6: Regressions Differences in Total Creativity Between Treatment Groups and PI and TP Overall, Controls Included

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	-0.245				0.033			
	(0.207)				(0.053)			
Overall TP		-0.181				0.074		
		(0.181)				(0.048)		
PI v. TP			0.035				0.012	
			(0.113)				(0.066)	
TP v. IP&TP				-0.302				0.045
				(0.369)				(0.083)
Obs.	197	197	99	95	197	197	99	95
r2	0.143	0.139	0.346	0.233	0.096	0.106	0.268	0.116

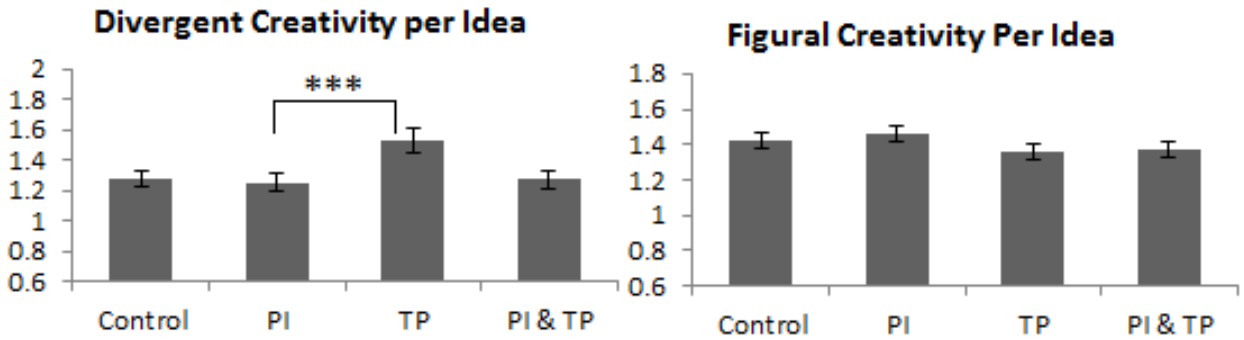
Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. PI) and tournament pay (i.e. TP) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

4.3.4 Per Idea Creativity Score

Per idea/unit of output creativity is a quality measure which is simply the creativity score, not taking into account the number of units of output over the number of units. There is evidence the quality of the output was significantly higher in the TP only group compared to all other treatment groups. The TP group had higher quality of ideas compared to the control and the IP only group at 5% significance level and an estimated quality of 18.8% higher compared to the control group. This is the only treatment which is significantly different to the control group. Table 4.5 shows that when dummies for all treatment groups are added this effect is no longer present.

TP only group has an estimated 23.4% higher per idea creativity at 1% significance level compared to the PI only group. There is no statistical significance between the two TP groups, although there is evidence this could be the case if there number of observations was higher. This gives some indication that the performance in the TP only group is higher fro per idea creative performance. The quality between the figural task was relatively similar with no significant differences in output quality between them.

FIGURE 4.3: Per Idea Creativity for the Two Creativity Tasks



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in tables 4.7 and 4.8 below.

TABLE 4.7: Regressions Differences in Creativity Per Idea Between Treatment Groups, Control Included

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	0.017			-0.069	-0.024			-0.013
	(0.067)			(0.117)	(0.048)			(0.094)
TP		0.188**		0.135		-0.056		-0.055
		(0.076)		(0.108)		(0.055)		(0.055)
PI & TP			-0.292	0.027			-0.059	-0.071
			(0.330)	(0.304)			(0.046)	(0.052)
Obs.s	102	103	99	197	102	103	99	197
r2	0.500	0.359	0.257	0.146	0.274	0.364	0.271	0.198

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression.

TABLE 4.8: Regressions Differences in Creativity Per Idea Between Treatment Groups and PI and TP Overall, Controls Included

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	-0.235				-0.015			
	(0.169)				(0.036)			
Overall TP		-0.033				-0.057		
		(0.150)				(0.038)		
Only PI v. Only TP			-0.234***				0.005	
			(0.076)				(0.053)	
Only TP v. IP&TP				-0.447				-0.015
				(0.292)				(0.056)
Observations	197	197	99	95	197	197	99	95
r2	0.165	0.169	0.335	0.340	0.188	0.197	0.385	0.362

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. PI) and tournament pay (i.e. TP) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

4.3.5 Subjective Score

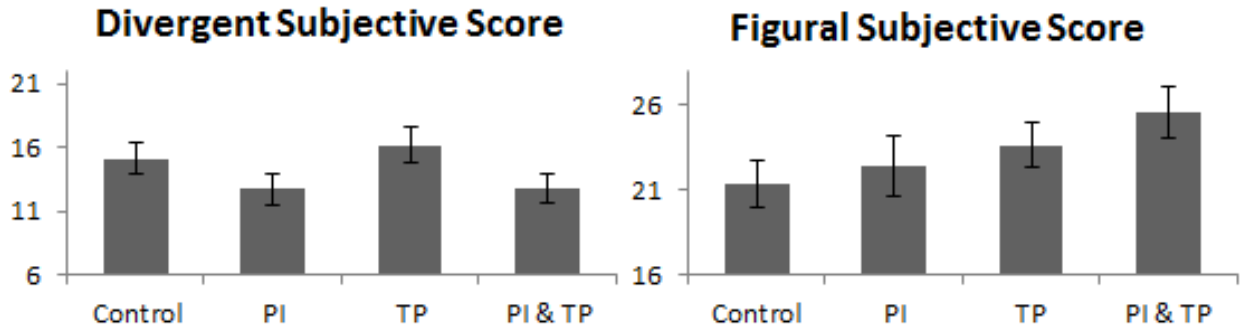
The subjective scores are based on the scores submitted by 2 judges which were then correlated with the scores given by participants during the experiments. The judge scores correlate significantly with the scores given by participants during the experiment as seen in the correlation between participant and judge scores in table 4.9.The strong correlation between the judges scores and the scores given during the experiment by the participants indicate the scores given by the judges represent a level of consensus in the quality of ideas. The similarity of the subjective judgments between the judges and participants indicates there is consensus on what is a high quality or low quality expression of an idea. Thus although there are two judges for subjective creativity there is evidence that their judgments of creativity likely do represent what subjective creativity is widely considered to be [3].

[3]In past research the researchers themselves have scored the participants creations using a criterion chosen by the researcher which often rely on statistical rarity (Runco and Albert, 1986; Kitto, Lok, and Rudowicz, 1994). Using two independent judges, as in the case of the current research, is common practice when judging creativity for creativity tests, such as, the divergent task (Silvia, Beaty, and Nusbaum, 2013;

TABLE 4.9: Correlation Coefficients between the Judges and Participant in Each Task

	Judges Score		Participants Score	
Total Scores	Divergent	Figural	Divergent	Figural
Divergent, Judges Score	1			
Figural, Judges Score	0.4844*	1		
Divergent, Participant Score	0.4962*	0.3737*	1	
Figural, Participant Score	0.3699*	0.4008*	0.4197*	1

FIGURE 4.4: Total Subjective Scores for the Two Creativity Tasks Between Treatment Groups Including.



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors which can be found in the appendix. Each bracket represents statistically differences between the indicated treatment groups. Relevant regressions shown in tables 4.11 and 4.12 below.

There are no significant differences between treatment groups in the either the divergent or the figural task. In the divergent task the PI only group has a higher subjective score compared to the control group. This difference was estimated at 108.6% lower in the TP only group with a significance level of 10%. This large estimated difference in table 4.11 compared figure 4.4 is due to the differences is the distribution of participants between the control and TP only groups which has underestimates the real difference between groups in figure 4.4. This difference was not significant when variables for all 3 treatment groups were added im comparison to just comparing the TP only group to the control group. For the divergent task the average subjective score was highest in the

Shobe, Ross, and Fleck, 2009; Jones and Estes, 2015; Eisenberger, Haskins, and Gambleton, 1999). In the case of the research at hand, the 2 judges were added to divorce the creativity rating and the experiment.This would decrease any possible bias that the researcher themselves could introduce and thus work towards a more objective score.

TP group and second highest is the control group with both PI groups being close to equal and lower than the non PI groups. The subjective scores have the similar pattern compared with output levels in the figural task with all of the means for the treatments being higher than the control group and increasing from PI only to TP and finally to PI &TP. This pattern is similar to the pattern found for the overall creativity for the figural task. The averages are higher in the two PI groups for the figural task which is largely explained through individual differences explained by the control variables and not due to the treatment.

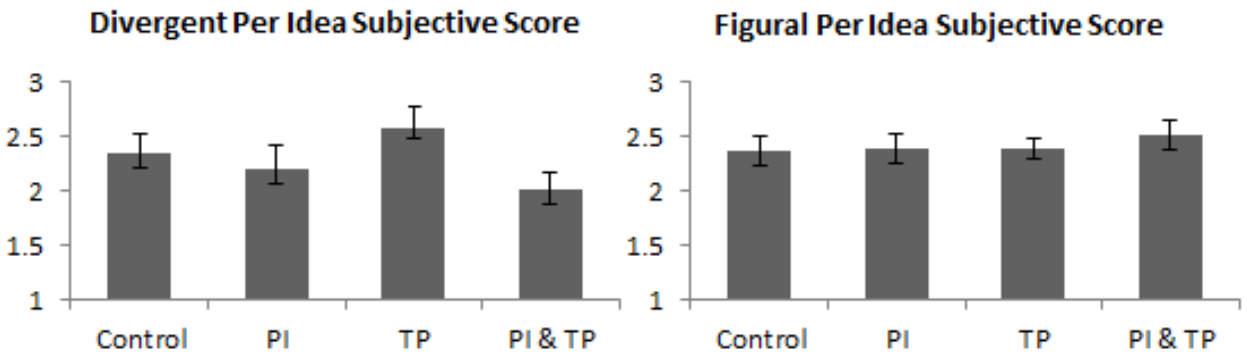
TABLE 4.10: Regressions Differences in Total Subjective Scores Between Treatment Groups and the Control

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	-0.569			-0.522	-0.083			-0.039
	(0.424)			(0.480)	(0.115)			(0.110)
TP		-1.086*		-0.967		0.032		0.069
		(0.595)		(0.596)		(0.124)		(0.099)
PI & TP			-0.713	-0.655			0.116	0.136
			(0.470)	(0.493)			(0.124)	(0.191)
Obs.	103	103	99	197	102	103	99	197
r2	0.294	0.209	0.215	0.085	0.169	0.245	0.245	0.138

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression

The means for per idea subjective scores figures in figure 4.5 have similar pattern to the means of the per idea creativity scores in figure 4.3. However there are no statistically significant differences between treatment groups. When disregarding the 0 scores there is some evidence that the TP only groups has higher per idea subjective scores as seen in the appendix for chapter 4. The per output subjective scores are similar to the per output creativity scores for the figural task. This is likely due to individuals choosing a strategy of focusing on output father than quality of the ideas and thus the subjective scores and creativity scores where highly dependent of the overall output rather than differences in quality.

FIGURE 4.5: Per Idea Subjective Scores for the Two Creativity Tasks



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in table 4.12 and 4.13 below.

TABLE 4.11: Regressions Differences in Subjective Score Per Idea Between Treatment Groups and PI and TP Overall

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	-0.115				0.015			
	(0.429)				(0.083)			
Overall TP		-0.557				0.117		
		(0.407)				(0.083)		
PI v. TP			0.384				-0.054	
			(0.759)				(0.115)	
TP v. IP&TP				0.408				0.065
				(0.728)				(0.129)
Obs.	197	197	99	95	197	197	99	95
r2	0.074	0.082	0.191	0.141	0.123	0.135	0.292	0.155

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. PI) and tournament pay (i.e. TP) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

TABLE 4.12: Regressions Differences in Subjective Scores Per Idea Between Treatment Groups and the Control

	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	-0.402			-0.385	-0.087			-0.048
	(0.351)			(0.408)	(0.083)			(0.080)
TP		-0.795		-0.764		-0.030		0.000
		(-0.529)		(-0.529)		(0.087)		(0.082)
PI & TP			-0.549	-0.541			-0.019	-0.007
			(0.404)	(0.421)			(0.091)	(0.084)
Obs.	102	103	99	197	102	103	99	197
r2	0.294	0.209	0.215	0.085	0.259	0.341	0.260	0.217

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression

TABLE 4.13: Regressions Differences in Subjective Scores Per Idea Between Treatment Groups and PI and TP Overall, Controls Included

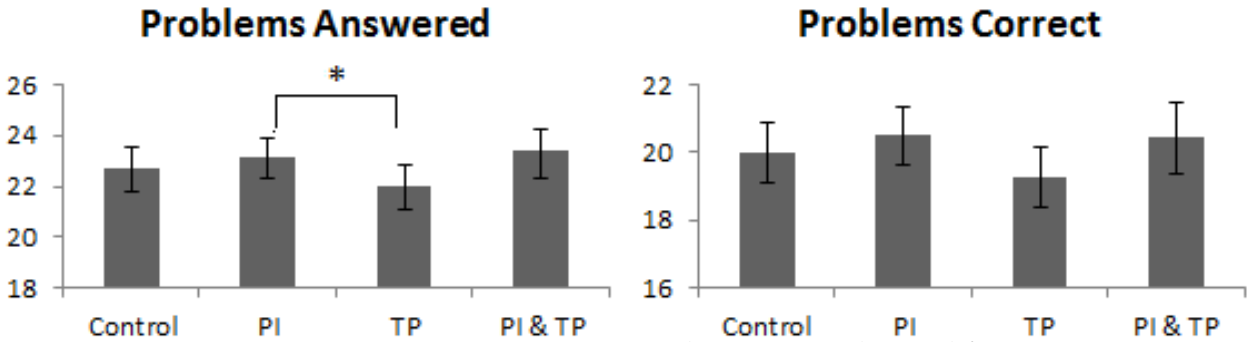
	Divergent Task (logged)				Figural Task (logged)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	-0.089				-0.028			
	(0.372)				(0.058)			
Overall TP		0.465				0.020		
		(0.354)				(0.061)		
PI v. TP			0.230				-0.066	
			(0.667)				(0.095)	
TP v. IP&TP				-0.313				0.012
				(0.648)				(0.087)
Obs.	197	197	99	95	197	197	99	95
r2	0.074	0.082	0.191	0.141	0.216	0.216	0.272	0.278

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. AR) and tournament pay (i.e. ER) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

4.3.6 Math Task

The math task is used as an effort/control task in order to observe differences in performance due to PI and TP in a non-creative task. The results can then be compared to the results from the two creativity tasks in order to draw conclusions about the potential differences in performance and explain why these differences may occur. Participants were given 30 simple addition tasks and asked to complete as many as possible in the 5 minutes given. However many of the 197 participants included in the study completed all 30 in the allotted time causing a clustering of data at 30. To gain insights into any patterns in the data the data were organised into two different data groups. One Data group took into account all data and did not omit any data from the analysis. The other group is a group where the data from everyone who answered all 30 questions were omitted in order to observe any potential patterns in the data for participants who submitted 29 or less answers. This group is called the under 30 group and the averages for all groups are displayed in the tables below along with the corresponding regressions.

FIGURE 4.6: Math Performance for the Full Participant Population



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in tables 4.14 and 4.15 below.

TABLE 4.14: Regressions Differences in Math Performance Between Treatment Groups, Controls Included.

	Total Solved (All)				Total Correct (All)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	0.049			0.058	0.060			0.047
	(0.075)			(0.064)	(0.094)			(0.081)
TP		-0.099		-0.066		-0.121		-0.095
		(0.061)		(0.066)		(0.076)		(0.073)
PI & TP			-0.030	0.011			-0.063	-0.044
			(0.064)	(0.057)			(0.083)	(0.077)
Obs.	102	103	99	197	102	103	99	197
r2	0.138	0.334	0.266	0.161	0.116	0.330	0.321	0.170

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression

When all observations were averaged there was a significant difference at 10% between the PI and TP treatments with the TP group having an estimated 12.3% more problems solved. It is also worth mentioning that the PI groups had an estimated 6.6% more questions solved compared to groups without PI at a significance level of just above 10%. There was no statistical differences in the number of problems solved correctly between the treatments. The TP groups had an estimated 9.2% fewer correct answers compared to non-TP groups at 10% significane level. Thus there is some evidence of a larger number of problems solved in the PI only group and an overall lower number of questions answered correctly in the TP groups. This however is especially interesting as TP only group has the lowest average for both questions answered and answered correctly. To gain a better understanding of potential patterns in the data the next histograms and tables only take into account the individuals who answered fewer than 30 questions.

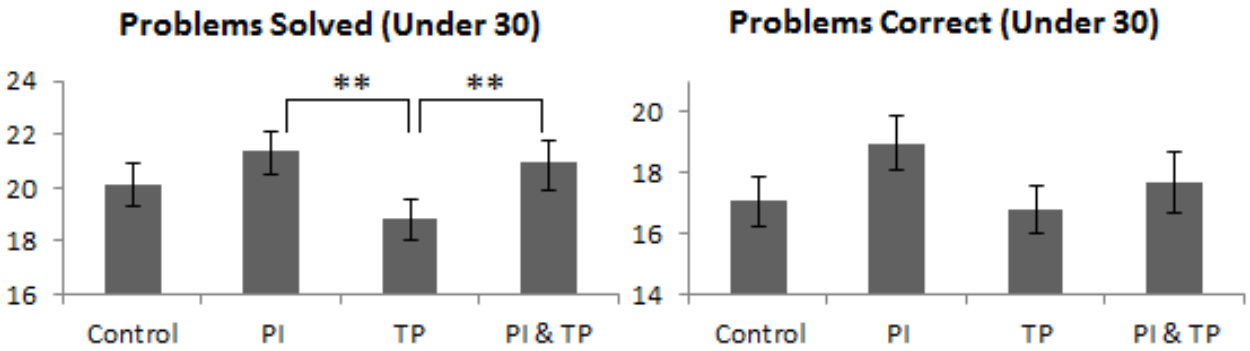
TABLE 4.15: Regressions Differences in Math Performance Between Treatment Groups and PI and TP Overall

	Total Solved (All)				Total Correct (All)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	0.067				0.048			
	(0.043)				(0.055)			
Overall TP		-0.056				-0.092*		
		(0.041)				(0.052)		
PI v. TP			0.123*				0.103	
			(0.070)				(0.076)	
TP v. IP&TP				0.084				0.037
				(0.057)				(0.072)
Obs.	197	197	99	95	197	197	99	95
r2	0.152	0.148	0.234	0.306	0.155	0.166	0.251	0.396

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. AR) and tournament pay (i.e. ER) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

Taking into account only the individuals who answered fewer than 30 problems the effects become stronger. The TP has significantly fewer questions than the two PI treatments i.e. PI and PI &TP at 5% significance. The estimated differences were 14.0% and 10.3% between the TP only and PI only and the PI %TP treatments respectively. The PI treatments also had an overall 10.0% higher number of problems solved, at 5% significance, compared to non PI groups. This corroborates the results found when taking into account all data and suggests that there are fewer answered in the TP only group and that the PI groups in general have a higher number of questions answered correctly. These affects are not as strong for the number of problems solved. There are no statistically significant differences between any treatments.

FIGURE 4.7: Math Performance for the Under 30 questions answered Participant Population



Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The stars are derived from regressions using Heteroskedastic Robust standard errors. Each bar has small vertical brackets indicating standard errors of the means calculated. Each horizontal bracket represents statistically differences between the indicated treatment groups which were found using regressions found in table 4.16 and 4.17 below.

Overall the results in the output for the divergent task and the control math task show some similarities when observing total output. This is especially true when observing only the 3 treatment groups. With the total output in both the math task and the divergent task being the lowest in the TP only group when observing the 3 treatment groups. It should be mentioned however that the control group had the highest output level in the divergent task while the total amount answered and answered correctly in the math task was highest in the PI only group. This can be observed when observing figure 4.2, 4.6, and 4.7. These similarities in results show that the way participants behaved in these two tasks were very similar to each other and diverged strongly from the patterns of output shown in the figural task. It is also interesting to see that when the under 30 group were observed the average number of questions answered in the PI & TP group was statistically significantly higher compared to the TP only group. However, the average number answered correctly was relatively similar between the two groups thus there is no difference in performance even though there is in output.

TABLE 4.16: Regressions Differences in Math Performance for Under 30 Between Treatment Groups, Controls Included

	Total Solved (under 30)				Total Correct (under 30)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PI	-0.117			0.086	0.159			0.128
	(0.087)			(0.086)	(0.107)			(0.090)
TP		-0.091		-0.071		-0.039		-0.044
		(0.068)		(0.063)		(0.088)		(0.080)
PI & TP			0.023	0.038			0.008	0.004
			(0.072)	(0.063)			(0.097)	(0.087)
Obs.	79	76	73	148	148	148	75	69
r2	0.240	0.413	0.301	0.215	0.192	0.362	0.353	0.178

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regression shows the treatment groups being compared to the control both individually and with all dummies combined in the same regression

TABLE 4.17: Regressions Differences in Math Performance for Under 30 Between Treatment Groups and PI and TP Overall, Controls Included.

	Total Solved (under 30)				Total Correct (under 30)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overall PI	0.100**				0.091			
	(0.043)				(0.059)			
Overall TP		-0.063				-0.088		
		(0.042)				(0.057)		
PI v. TP			0.140**				0.121	
			(0.064)				(0.080)	
TP v. IP&TP				0.103**				0.025
				(0.048)				(0.072)
Obs.	79	76	73	148	148	148	75	69
r2	0.206	0.177	0.296	0.490	0.160	0.160	0.217	0.437

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis. The regressions show the overall affect of both public information (i.e. AR) and tournament pay (i.e. ER) on the top two rows respectively. In the bottom two rows the show how the TP only treatment differs from the PI and also the PI&TP treatment group respectively.

4.4 Discussion

The results presented is in response to the reported lack of empirical evidence on the subject of Copyright (Atiq, 2013). Specifically the results deal with the impact of public information (PI) and tournament pay (TP) structure which derive from the concepts within copyright research of attribution and economic rights. These results can also be applied to the discussion of innovation more generally as factors affecting creativity are highly relevant to innovation and to the wider innovation literature. Creativity, when it comes to the cognitive process, is unique. It is a process which requires a heuristic or open-ended approach compared to algorithmic tasks which have a single obvious solution (Amabile and Pillemer, 2012). The focus of the discussion is how do public information about an agents production decisions (PI) and tournament pay (TP) affect the market for creative goods? What consequences do these have on the performance of market participants and why? Do the results support or go against prevailing arguments on copyright incentives or promoting creativity/innovation more generally? Which avenues might these motives effect creativity through?

The assumptions of anonymous markets and profit maximisation can be found from examples of prominent theorists in the field of copyright and IP law. Landes and Posner make these core assumptions of anonymity[4] and profit maximisation when arguing for indefinitely renewable copyright. The proposed model describes agents in the market who provide goods in the market or continue to provide goods in the market which have a positive market value. This theory does not take into account the findings that there is a overproduction of creative goods in the market (Menger, 2001; Mathieu, 2015). A possible explanation is the "art for arts sake" principle or the fact that art is largely intrinsically motivated and subsidised using income from other sources (Abbing, 2011, p. 39, 113; Towse, 2001, p. 485). The assumptions of anonymity and profit maximisation are also made by Boldrin and Levine when modelling how a competitive market would lead to an efficient market outcome[5].The authors argue that IP laws create innefficient monopolies and a competitive market with the use of, for example subsidies, would be more efficient (Boldrin and Levine, 2006). The paper uses alludes in passing to a reputation affect but keeps the assumption of the profit maximising agent. These assumptions are derived largely from classical economic theory and so excludes some of the nuances of the creative industries.

The two aspects of the creative markets which the paper focus on is the existence of non-anonymous markets(Abbing, 2011, p. 79) and production which is largely done for

[4]Although this is done implicitly it does show how the problem is being approached using the core assumption of anonymity.

[5]This is compared to a situation with intellectual property rights.

the sake of the process or "art for arts sake" (Caves, 2002, p. 3) and largely subsidized through outside income (Towse, 2001, p. 485; Abbing, 2011, p. 39; Kretschmer and Hardwick, 2007). These aspects of creative markets would make it difficult to model a creative market using assumptions of anonymity and profit maximisation, which are two core assumptions of market theorists. This chapter will not focus on modelling the problem but rather it will discuss the results in relation to existing literature on motivation and markets in order to analyse what motives are important and how creative production could be encouraged. Specifically the market structure in most markets for creative goods are unique in the way there is constant over supply and high individual intrinsic motivation. Very similar to what one might find in the market for athletic talent, especially in sports which might be popular and thus have a large amount of people competing for a fixed number of professional contracts.

There is agreement in psychology literature that intrinsic motivation is an important part, if not the most important part, of motivating creativityAmabile, 1997; Eisenberger, Haskins, and Gambleton, 1999; Eisenberger and Cameron, 1996; Grant and Berry, 2011; Stanko-Kaczmarek, 2012; Shalley and Perry-Smith, 2001; Morningstar, 2012). Empirical evidence of individuals contributing to non-profit projects, such as open source software, found the most prominent driver is enjoyment-based intrinsic motivation even though 40% of respondents were being paid for their efforts (Lakhani and Wolf, 2003). When intrinsic motivators and extrinsic motivators were compared using a cohort of art students it was found that intrinsic motivators were more effective in motivating creativity (Stanko-Kaczmarek, 2012). The extrinsic motives used in the study was non-monetary and participants were motivated by stating that they should expect an evaluation of their performance, similar extrinsic motivation present in the PI treatment. This is not to say that TP, or even IP, are not important when discussing creativity, rather it is important to recognise the role of extrinsic rewards as a complement, or substitute, to the already existing intrinsic motivation. Care should be taken to note if market incentives and copyright support or work against the existing intrinsic incentives.

It is possible that there is no intrinsic motivation to produce and in these circumstances there would be no crowding out. However this is unlikely in the creative industries as market participants earn significantly less on average compared to the average income(Abbing, 2011; Kretschmer and Hardwick, 2007; Kretschmer, 2012, p. 113). In addition art is often created for the sake of creating art along with artists feeling the need or want to serve art (Abbing, 2011; Caves, 2002, p. 79, p. 3-5). This suggests that there is value for the creator in creating, and not necessarily only selling, their creative expressions/products. The market is also unlikely to be populated by pure profit maximisers as they would likely have a high opportunity cost and find better paying work outside the

markets for creative goods. Thus it is as if people are willing to enter the market as the intrinsic aspect of the process is so appealing that individual market participants would be willing to take the lower pay, or even subsidies their income from other jobs. However this might not be the case as artists are thought to know little about the market they are entering and have also been suggested to be overconfident when calculating their own probability of success (Abbing, 2011, p. 119).

The results find that TP and PI do have a strong effect on creative and subjective performance. There is some evidence that the TP only group had significantly lower output compared to the control in the divergent task. For the figural task there is also some evidence that output in the TP groups had lower creativity compared to non-TP groups. There is no overall pattern in the way individuals performed in the two tasks, but there is some evidence that pay structure is important when observing pure output levels. Observing the output in combination with the creativity and subjective scores allows for a quantity versus quality analysis to be made. Using this analysis it is possible to observe how strategic game play by the participants can differ between treatment groups. This suggests that individuals are more likely to compete using quantity rather than quality when public information about other players/participants actions and performance are known.

In the divergent task when tournament pay was present but players were anonymous there was more focus on creative and subjective quality. The is an indication that there is lower creativity compared to the control group but no other differences in overall creative performance between treatment groups in the divergent task. The per unit creativity was significantly higher in the TP only group compared to the PI only group which suggests a focus on quality of the ideas, which was not present in other groups. These results would suggest that public information can influence production decisions in the market for creative goods and how individuals compete in the market. Thus there is some evidence that creativity per idea in the TP only group is significantly higher compared to the two non-TP groups but not significantly different to the PI & TP. In fact, if the sample size was larger it is possible that the PI & TP group had higher creativity per idea performance compared to all other treatment groups. This makes it very hard to be able to rule out that the existence of public information in a TP group can negate any incentive which is presented by a tournament pay structure.

It is important to note that subjective creativity was directly motivated through the incentives in the market i.e. it was profitable to create ideas which were liked. Creativity on the other hand was indirectly incentivised as individuals might like more creative ideas but a more creative idea might not directly affect the subjective judgment given. The markets for creative goods are not necessarily promoting objective quality but subjective

quality. It would stand to reason that supporting production, through laws such as copyright, in this environment would reinforce this market incentive. However the effects of the treatments vary significantly suggesting that these do not necessarily directly support the already existing market incentives but rather change/distort the way the market operates. For example the overall subjective scores are significantly lower in the PI groups and the TP only group had significantly higher per unit subjective scores compared to PI and PI&TP treatment groups in the divergent task.

How these incentives might influence creativity in general however is not as clear because the results from the two creativity tasks do not corroborate each other. The figural task results are different compared to the results from the divergent task and seem to show an increase in overall output as public information or tournament pay is introduced and there is no evidence of any difference between treatment groups in per output performance either in terms of creativity or subjective judgments. This is likely due to the fact that these tasks are fundamentally quite different and taking into account the rank in the divergent task does not change results in a meaningful way. The patterns of output in the math task and the divergent task also seem to suggest that these two tasks might be more related in the way participants react to market incentives compared to the figural creativity test. This further suggests there is something fundamentally different in how these tasks are completed by the participants.

The results from the first task did not persist in the second of the two creativity tasks. Tournament pay, regardless of public information, did not significantly influence total creativity or subjective scores. The number of ideas was larger in the tournament pay groups which drove the higher averages observed for the subjective and creativity scores. Thus there was no difference in the quality per unit but rather a larger number of units in the tournament pay groups. This difference in the results is likely down to two potential factors; market feedback/learning or differences in the tasks themselves. It is unlikely learning of the task was any different between treatment groups from one task to the next as the participants were shown examples before participating in the task and the mechanics of the task were known even before the task. It is also the case that market feedback can be controlled for using information about each participants rank/performance in the previous tasks as mentioned briefly earlier in the results section. It is as if the better performing individuals would receive higher quality feedback about performance in the tasks where public knowledge is restricted. This is because participants who ranked high received better information about what the market considered as a quality input compared to participants who ranked lower. Controlling for a participants rank did not change the results significantly indicating that market feedback is an unlikely reason for the changes in strategies between the two tasks.

This is also corroborated by the results from the control task indicate that the incentives still have an effect even in the last task which indicates similar behavioural patterns compared to the divergent task. Individuals in both the public information treatments had higher output on average compared to the TP only group, indicating a focus on output in both the divergent and math task. If the feedback effect was to persist we should observe a persistent difference in behaviour when the results are shown after the divergent task. It is more these behavioural differences are due to the type of task compared to any reaction to information regarding rank. Although it still could be that individuals react to each set of results and rank information separately, however the similarity between the behaviours in the first and last task would indicate this is likely not the case. It is also highly unlikely the difference is from the reduction of the effectiveness of the incentives as the incentives show evidence that there are significant differences in performance/output between treatment groups similar to the ones seen earlier in the task as well.

It is more likely the case that the type of task matters which in turn influences their production decisions. For example if individuals see the units of output created are equal in their quality, it would stand to reason that participants would choose to compete using quantity and not quality. If participants feel as if they cannot differentiate themselves through quality they have a better chance of success by grabbing market share through increased production and thus increasing their overall popularity.

(Rosen, 1981) propose that in winner-takes-all markets "superstars" gain market share not necessarily through quality but the ability to provide quality more efficiently. The author also suggests that consumers decrease search costs by choosing for quality sellers (Rosen, 1981). The results in the first task suggest that when there was public information in the creation stage market participants were more likely to compete through quantity. When only tournament rights were present creators opted to compete through quality in the divergent task. This changes in the second stage/task when market participant in both tournament pay treatments opted for a strategy of producing a higher number output, although not significantly different, without differences in the quality. This suggests there is a difference in production strategies in a winner-takes-all markets which can depend on task or type of production. Theory suggests a tournament/winner-takes-all pay structure is best to induce effort when qualifying output is tough but deciding rank is easy (Lazear and Rosen, 1981). Qualifying output is tough but deciding rank is relatively easy in copyright industries, however the results seem to suggest that the type of effort agents exert can depend on the information they receive in the market and the type of task they are taking part in.

When participants focused on quality and fewer units of output in the TP only group

they had higher per unit performance. PI groups also had lower average per idea subjective scores, although this difference was not statistically significant.. Interestingly there was limited evidence that TP only treatment had lower creativity scores compared to the control suggesting there can be a trade off between quality and quantity which would not necessarily affect the overall creativity or subjective scores. Rather indicate a conscious decision by the producer which depends on the information available in the market. Suggesting that public information about production decisions pushes individuals to be more likely to compete using quantity compared to quality. Thus it becomes more important to recognise what the market is incentivising to fully understand the effect of policies, such as, copyright which work to support existing market incentives.

When it comes to organizational literature it is difficult to place the results in seamlessly a the results are varying between tasks. However there is some evidence of crowding out in the math task with a similar pattern found in the output for the divergent task. In the math task the TP only group showed the lowest performance of the 3 treatment groups and a lower performance compared to the control group. Thus the performance with only the external incentives of the tournament pay show lower performance on average. This is similar to the findings of Deci and Amabile where there is a decrease in performance in the pay groups indicating a decrease in intrinsic incentives (Deci, 1971; Deci, 1972; Amabile, 1983; Amabile and Pillemer, 2012). However this crowding out does not occur when there is public information and tournament pay. These results point to the public information being a stronger incentive compared to tournament pay as the potential crowding out, found in the TP only, group disappears when the public information is added. However existing literature on the two types of incentives do suggest that the intrinsic incentive is stronger than the internal incentive (Deci, 1971; Deci, 1972; Amabile, 1983; Amabile and Pillemer, 2012). Thus it could be that public information acts more like a intrinsic incentive which would explain this difference in results between the two pay groups. This suggests that the crowding out might only occur in limited situations in the creative industries and that instead of crowding out intrinsic incentives tournament pay might simply be a weaker incentive for the math task.

This is more likely to be the case for the math task but the story is different when observing the divergent task. First off there is no significant difference between overall production between treatment groups although there is some indication. Based on average output in the treatment groups, that the same crowding out effect might be taking place. However the highest average output level is present in the control group and the two groups with PI are in between the TP only group which has the lowest average output and the control group which has the highest. There is again some indication that the PI incentive cancels out the incentive from the TP as the effect from tournament pay is

decreased when PI is introduced.

The previous effects were only for output in the divergent task however, when it comes to creativity and subjective scores these effects do not take place. In contrast, the math task both output and quality of the output, i.e. the number of correct answers, were very correlated and showed very similar patterns between treatment groups. In the divergent task the best quality was found in the TP only group with the conrtol group and the PI only group have significantly lower quality or per output creativity.Although the per idea subjective scores closely mirror the patterns seen in per idea creativity scores there are no statistical differences between treatment groups. Thus there is some evidence of a quality over quantity trade off in the TP only group which is not present in any other groups.There does seem to be some crowding out when it comes to motivating output but not necessarily effort overall. These results point to individuals competing using quality in the TP only group where no information about the individuals production decisions were present. These results however are not strong, but when regarding 0's for creativity as outliers this patterns becomes more obvious as seen in the appendix for this chapter B.

Based on output means in the divergent task individuals focus more on output in the PI groups compared to the TP only group. This would suggest a decision to compete by increasing their output and thus their relative market share cet. par. However the overall creativity scores show a 15.7% lower creativity in the TP groups compared to the non TP groups which would suggest this strategy might not be the best to increase overall creativity even though it does increase the quality of the ideas. Overall the mean creativity for the control group is the highest of the 4 groups which indicates that the incentives might not increase creative performance although these differences are not statistically significant. Thus although there is some indication of higher output in the PI groups the creativity scores are even with the TP group if not lower. This points to there being no difference in overall creativity between the treatment groups but a difference in the quantity versus quality decision making within the groups.

There seems to be no evidence to show the treatments effect overall subjective scores although the mean per idea subjective scores are the highest in the TP-only groups as it was for creativity per idea. Overall the means follow a similar pattern as the TP only group has higher pre idea subjective scores compared to the PI only and PI & TP group. Since the subjective scores were what decided the rank it indicates that if anything it can be worthwhile to focus on quality and not necessarily output or market share in order to maximise ones chances of success. This is because the means for the TP only group ere the highest for overall and per idea subjective scores. However there is no evidence of statistical significance, even thought there could possibly be given a higher number of observations. It should be mentioned that these subjective scores were given

by the judges which were found to correlate strongly with the subjective scores given by participants in the experiment. Thus it is not sure that these subjective scores do fully reflect the overall popular opinion perfectly but it is fit for purpose to the degree that some conclusions on the overall subjective judgments of the participants can be made using the judges scores as the proxy.

These results suggest that the strategy on quality over quantity seems to be the best in order to maximise ones chances at market success in the stylised market. It also indicates that public information can not be completely disregarded when observing what influences how market actors operate within a market. Pushing individuals away from focusing on quality to instead focus more on competing through output and market share. The TP only treatment promotes a strategy which maximises the overall probability of success in the market due to the highest per idea and overall subjective scores. However this market success does not translate fully to creative success as the TP only groups still have significantly higher per output creativity scores. This indicates that there is likely some misalignment between maximising overall creativity which would benefit the community compared to maximising ones chances to be successful in the market. Importantly these effects take place in the divergent task only.

The effects present in the divergent task and the math task are not present in the figural task. In the figural task the control has the lowest overall average output and with steady increases in production from the control to the PI only group, then to the TP only groups, and finally the PI & TP group. This is the similar pattern found in the levels of overall output although there is no statistically significant difference between the output in the treatment groups. Compare this to the divergent task where there is in some cases evidence of PI deleting any effects from TP. If anything the TP and PI incentives work to strengthen each other in the figural task, although there are no statistically significant differences present in the results. There are some patterns of TP increasing output by an estimated 9.7% at 10% significance and this same pattern is found when observing total creativity and total subjective scores although no statistical differences were observed. In addition the creativity and subjective scores were largely dictated by the output levels. Thus there is evidence to suggest that the effectiveness of the incentives can truly be influenced by the type of task. It is possible that the figural task was seen to have been much easier in terms of its cognitive demand and so the only differentiating factor to maximise success might have been output or market share which caused the pattern of increased production in the TP groups. However it is hard to say that this was in fact the case. Evidence of similarity of the results between the divergent task and the math task do point to this being a possibility as they both might have been cognitively more challenging. This could cause the availability of public information regarding production in the market to

influence the way individuals made their production decisions as they could have relied on quick heuristics due to the combination of pressure and cognitive stress which might have not been present in the figural task.

4.5 Conclusion

Markets for creative goods have a very distinctive structure, more often than not they have a winner-takes-all structure which favours the artists who are popular. Popularity which is largely due to their skill set but also influenced by their reputation visibility in the market and even luck plays a role as illustrated to the no-one-knows principle of Caves. These markets are vastly different compared to the "traditional" market where individuals or firms compete for custom in an anonymous market with rational agents who base their production decisions on profit maximisation. In the latter case the market incentives and demands are clearer compared to the market for creative goods where the market signals are noisy.

This paper argues that the market incentives, such as public information and tournament pay, can affect market performance differently depending on aspects, such as, the task or the market conditions. It is likely copyright does not have an uniform affect on production over the markets for different types of creative goods. Rather copyright influences the market though guaranteeing rights, such as attribution/public information and economic rights/tournament pay, which influence the market environment. Experiment results indicate that there can be a difference between acting anonymously and in an environment public information regarding a participants production and performance. To assume copyright is a singular incentive which works through its role as a tool to recoup fixed cost of investment in creative goods would be ignoring the complexities of the markets it is relevant in and the types of creators which exist in it.

Interestingly tournament pay can have a very different affect of the way market agents compete depending on the task and the whether public information is present or not. In some tasks they induce production but not necessarily quality, while in other tasks the impact of tournament pay can depend on the existence of public information. These differences strengthen the argument that it is unlikely that these incentives or copyright have a uniform influence across markets of different goods. This is especially relevant as copyright is often discussed in terms how the financial incentive of ownership of work can allow the individuals to recoup their fixed investments of creation and so increase their overall output. The results do not show this to be the case uniformly, in some cases tournament pay or the ability to gain financially from ones output did indeed motivate an increase in output. However there is also some evidence that when there is a task which

is cognitively more taxing tournament pay on its own can spur quality while sacrificing quantity, but when combined with the public information can completely change individuals strategy to focus more on output and the overall visibility in the market or market share. This evidence of interaction indicates that public information can be viewed as the stronger of the two incentives as the quality over quantity strategy was present in the tournament pay only groups but there is no evidence of this in the tournament pay and public information groups when considering per idea creativity and math scores.

Unfortunately there are not strong enough results to say anything definitive about the impact of Pi and TP in the experiments but there is some indication that performance can vary based on task as well. There is also some indication there could be an interaction between TP and PI as incentives for performance which does not completely close the door for future research. However the variance in all data shows that the observation numbers need to be far higher for more definitive results.

Chapter 5

Performance and Satisfaction

5.1 Introduction

5.1.1 Fairness in Creative Markets

A significant proportion of fairness literature focuses on how fairness considerations might impact individuals' decision making in different games such as ultimatum games or public goods games (Fehr and Schmidt, 1999; Fehr, Fischbacher, and Fong, 2003; Schotter, Weiss, and Zapater, 1996; Mendoza, Lane, and Amodio, 2014; Kim et al., 2013; Weg and Zwick, 1994). In general the games are used to better understand decision making in market conditions and how fairness might influence this. The experimental method is also used to study whether fairness considerations even exist, or if fairness consideration might be caused by something else. This is especially interesting as fairness, unlike efficiency, has no automatic enforcer or forces which move the markets to a fair allocation (Feldman and Kirman, 1974). This means that the market naturally moves toward an efficient allocation or equilibrium; essentially forces such as rational profit maximization and demand for goods act such it is as if an invisible hand is moving the market to an equilibrium. However fairness has no such influence in the market which would move the market, like an invisible hand, to a fair allocation. This calls into question what is a fair allocation, and is this even a conceivable concept?

Fairness is a difficult concept to give a specific and rigid definition to as it can be subjective and context dependent. For example in labour market, fair can be considered the equilibrium wage or a wage which is fair only compared to other market participants (Akerlof and Yellen, 1988). Fairness can also be almost opposite to efficiency as there are forces which push the market away from a fair allocation. For example, in a market game with proposer or responder competition, it is very difficult, if not impossible, for fair players to achieve a "fair" outcome (Fehr and Schmidt, 1999). This is especially important as even small increases in competition can induce large behavioural changes in games

(Fehr and Schmidt, 2003). Thus as competition increases it is likely the market is driven further from a fair allocation.

This is especially relevant in markets for creative goods where competition can be very intense and the market is filled with individuals who subsidise their market participation through income from other jobs. Interestingly consumers in winner-takes-all markets, such as the markets for creative goods, are theorised to minimise consumption costs by choosing high quality producers or brands (Rosen, 1981). This would further concentrate the competition as effectively only the high quality producers/output would be able to satisfy demand. The market for creative goods also exhibits the 'no one knows principle' which, to some extent, illustrates the subjective nature of what quality is. This makes the prediction of what will be quality or popular hard, if not near impossible. Thus many producers compete to be perceived as higher quality than others, and only a select few gain the advantage of this higher quality perception, therefore forcing the large majority to settle with low or no demand for their products/output.

These factors make the market for creative goods, and winner-takes-all markets more generally, a difficult terrain for a fair allocation. So why might these fairness considerations be important when discussing markets? There is evidence suggesting individuals are not self-interested but rather they are strongly motivated by concerns for fairness and reciprocity (Fehr, Klein, and Schmidt, 2007). Thus the perceived fairness of a market can significantly influence welfare and future production decisions. In addition, although reciprocity might not seem relevant, it can be relevant when discussing how only the efforts of a few are reciprocated with demand and thus can influence an individual's decision on whether to remain in the market, or leave.

Varian (1974), stated that the fundamental problem is whether envy is due to some ability which cannot be traded. If this is the case, then a fair allocation of resources cannot be achieved. However, if lower ability workers can produce the same painting as Picasso or the same output by exerting higher effort then substituting between the two, it is possible to define a notion of fairness. Individuals would only be able to complain if they would be willing to put in the amount of work required to produce the same output (Smith, 1976). The key question thus becomes is this type of substitution between talent and effort possible in the market for creative goods? Obviously the market spans many different types of goods and thus it can be hard to give a generalisation which is true for all goods, but it is possible to outline some key characteristics which can be used to decide whether the possibility of a talent effort trade-off is possible.

Nobody-Knows

The principle of 'nobody knows', detailed by Caves 2000, is a principle which states that there is some unobservable quality of a piece of art which dictates the success of a creative good (Caves, 2002, p. 3). This does not necessarily have to be a quality, but could be a combination circumstances that allowed the piece to be successful. A similar theory is forwarded by Howard Bloom, a successful manager of musical acts in the 70's and 80's, who describes the existence of some higher energy or charisma type quality which somehow channels or taps into the energy of a mass and thus draws people to a person or a performer[1]. These two concepts do not completely align with each other, however, as there is opportunity to learn how to become a better performer or tap into the energy of the audience, whereas the 'nobody knows' principle simply states that there is some unobservable aspect that influences the potential for success. The key question that forms, then; is it possible to maximise success through effort, to the extent that talent or luck could be substituted by hard work? Although it can be possible, at least to some level, improve the performers' skills, there is still not enough evidence to suggest that talent, and perhaps more importantly luck, can be substituted by effort.

Talent or Genes

To see why talent or genes might play a role in the ability to substitute talent with effort, it is important to recognise the creative industries as individuals competing against all other market participants to "win" or be successful. Thus if individuals have some genetic advantage which increases their ability to some level where people cannot compete simply through increasing effort, then it is unlikely a fair outcome can be achieved in the market. In sport for example, biomechanics are very important and give a large advantage to athletes, such as Usain Bolt who has almost perfect biomechanics to be a world class sprinter. Similar advantages arise in some creative industries like vocal range and the ability to paint/draw, which can give significant advantage when producing creative works. It is also common knowledge that Picasso himself was an artistic savant being accepted into art school at only 13 while completing the application process in a week when it normally took months (Rouge, 2005, p. 50). These are very real advantages for artists as not only do savants gain attention which can help them, but they have an advantage in producing the works themselves. This would suggest that given the relative advantage the talented would have in the market, a talent effort trade-off is unlikely in the creative markets. As a result, a fair allocation in these markets can be impossible to reach. Given this, a fair allocation or an allocation where there is no envy is not something that should

[1] found in spin magazine 1995 vol 10 and in roganpodcast 1119.

be emphasised when discussing effective policy regarding markets for creative goods. Everyone will not be starting with the same or even a comparable endowment, so much so that these differences in endowment can be impossible to bridge with effort. The best that can be done is to make sure the market mechanics are not skewed in anyone's favour in order to avoid giving disincentives for effort. This is assuming that the more effort is put into production, the better.

5.1.2 Small Markets & Market Structure

However, the previous discussion might not hold true for smaller markets as the overall number of market participants can be so small that large differences in the endowments of market participants is unlikely. This is not to say that small creative markets are unlikely to have savants participating in them, rather that this is a relatively unlikely event compared to markets which have a large population of market participants. This is important because if the endowments of the market participants are relatively similar then a talent effort trade-off is more likely, meaning focus on a fair allocation between market participants is more relevant in smaller or emerging markets. This means it can be beneficial for policy to focus on creating a level playing field with minimal barriers to entry to promote growth of a new or emerging form of art or other innovation. However it is important to bear in mind that any effort to maintain "fairness" afterwards would be counterproductive.

5.2 Fun, Fairness, Envy, and Satisfaction

This section will discuss the individual characteristics of market participants in the market for creative goods. The aim is to observe how individual characteristics influence performance, perceptions of satisfaction and fairness, and what the consequences for individual utility could be. In a broad sense economics can be described as a subject that focuses on utility maximization taking into account social and physical constraints such as a freedom to choose where to work, how to use finite resources to maximize utility, or the well-being of society. Often mathematical modelling is used to do this, with some simplifying assumptions to make the model simpler and intuitive. These models often, although not always, overlook more subjective aspects of utility, such as fairness or satisfaction, as they can be hard to quantify or accurately model. This is not to say they are completely ignored by economics, but rather that often economics use proxies like wealth instead of happiness, for example, arguing that the wealthier a person is the happier they will be cet. par. This can cause over simplification of the problem of utility maximisation

and ultimately cause people to misinterpret economics as a subject. It could be viewed as solely interested in the maximisation of wealth at the expense of nuanced problem solving or a perceived "truer" representation of utility maximisation.

This chapter will address how more subjective judgments such as fairness, fun, satisfaction and envy are influenced by the market environment and performance and what other individual factors may influence market performance. Ultimately, discussing utility from the subjective perspective of fairness, satisfaction, or even fun, and the relationship these measures have with observed performance. Utility is discussed both in terms of the producer and the perspective consumer of the creative outputs.

Envy, fairness, and efficiency are concepts that are strongly linked. They are often discussed in the context of social welfare, and especially fairness and envy relate to the problem of envy-free, initially introduced by George Stern in 1958 in the pie cutting problem. Fairness itself is a complex concept, as a result of its subjectivity, which can cause problems when trying to determine what is "fair" allocation. The problems introduced by fairness considerations have been previously adapted to areas such as bargaining (Fischbacher, Fong, and Fehr, 2008), contract design (Fehr, Klein, and Schmidt, 2007), and efficient allocation of resources (Varian, 2006). These studies approach the problem of fairness using varying methodologies and angles of investigation, but the common thread is how fairness considerations influence economic decision making. This chapter will discuss what influences fairness perceptions with further discussion in terms of the problem of fairness relative to solving a fair outcome or allocation in the market.

5.3 Results

The measure for fairness used is reward fairness, and for satisfaction is performance satisfaction, for simplicity they will be referred to as fairness and satisfaction. In addition to fairness and satisfaction, perception results for envy and the level of perceived fun are observed. These four variables will constitute our variables of interest. The mean of the 4 variables are observed in relation to three variables: treatment groups, overall rank success of all tasks, and the number of times an individual ranked 1st from their group, these constitute our variables of comparison. The aim is to be able to observe how the 4 variables of interest are influenced by the three variables of comparison. This is carried out by observing differences or similarities in how variables change given variation in treatment groups or success. In addition, treatment or control variables can be introduced or dropped to observe how significance levels or coefficients change. Two most important variables of interest are reward fairness and performance satisfaction and how the two variables might be related. To observe basic variations in the data, and their significance,

there are histograms of the means of the variables, t-tests, and regression results relating to the histograms to observe the variation in data and whether this variation is significant or noteworthy.

Differences Between Treatment Groups

Figure 5.1. one illustrates the means of fun, envy, satisfaction in one's performance, and perception of reward fairness in the 4 different treatment groups. In this context envy, or the desire to trade places with other participants is a dummy variable i.e. yes or no, and as such can be hard to find significant differences between distributions. In the control group for example, there were about 20% of people who reported to want to trade places which is close to significantly different to the over 30% of participants who did the same in the PI group. But even this was only significant at 10.1% significance level observable in table 5.1. Strictly speaking there are no significant differences in reported envy between the treatment groups although it is worth noting that the envy is the lowest in the control group where the consequences of one's performance and relative rank had no impact on their pay or how others perceived them.

The means for performance satisfaction and reward fairness are very similar in their patterns. Both are significantly lower in the groups with TP compared to the groups without TP. The significance level of the differences between the TP and non-TP groups were under 8% although 5 out of the 8 total differences measured between treatment groups for both fairness and satisfaction were below a significance level of 2.5% thus there is strong evidence that both are significantly lower in the TP groups. Participants reported a significantly lower level of perceived fun in the TP-only group compared to all other treatment groups which were not significantly different from each other. The means reported for fun were very similar at around 7 with the approximate score of 6 in the TP-only group. Indicating a significantly lower level of perceived fun or enjoyment in the TP-only group compared to all other groups.

FIGURE 5.1: Averages between Treatment Groups

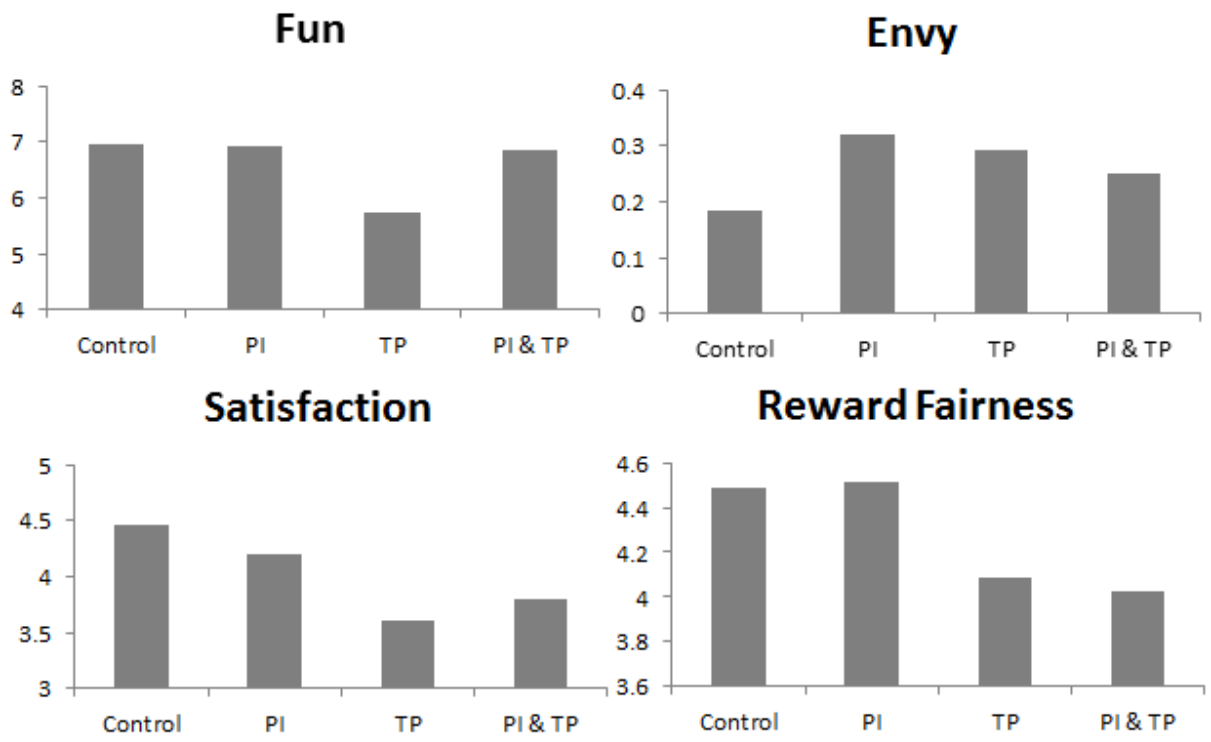


TABLE 5.1: T-Tests for Differences in Distributions between Treatment Groups

	CvPI	CvTP	CvPI&TP	PIvTP	PIvPI&TP	TPvPI&TP
Envy	0.101	0.1743	0.4777	0.7787	0.385	0.5492
Fariness	0.9981	**0.0646***	**0.0213****	**0.054***	**0.014****	0.8116
Satisfaction	0.2573	**0.0004*****	**0.006*****	**0.0123****	**0.077***	0.6095
fun	0.8708	**0.0085*****	0.7662	**0.014****	0.8768	**0.0416****

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The table shows which means are statistically significantly different from one another as seen in table 5.1.

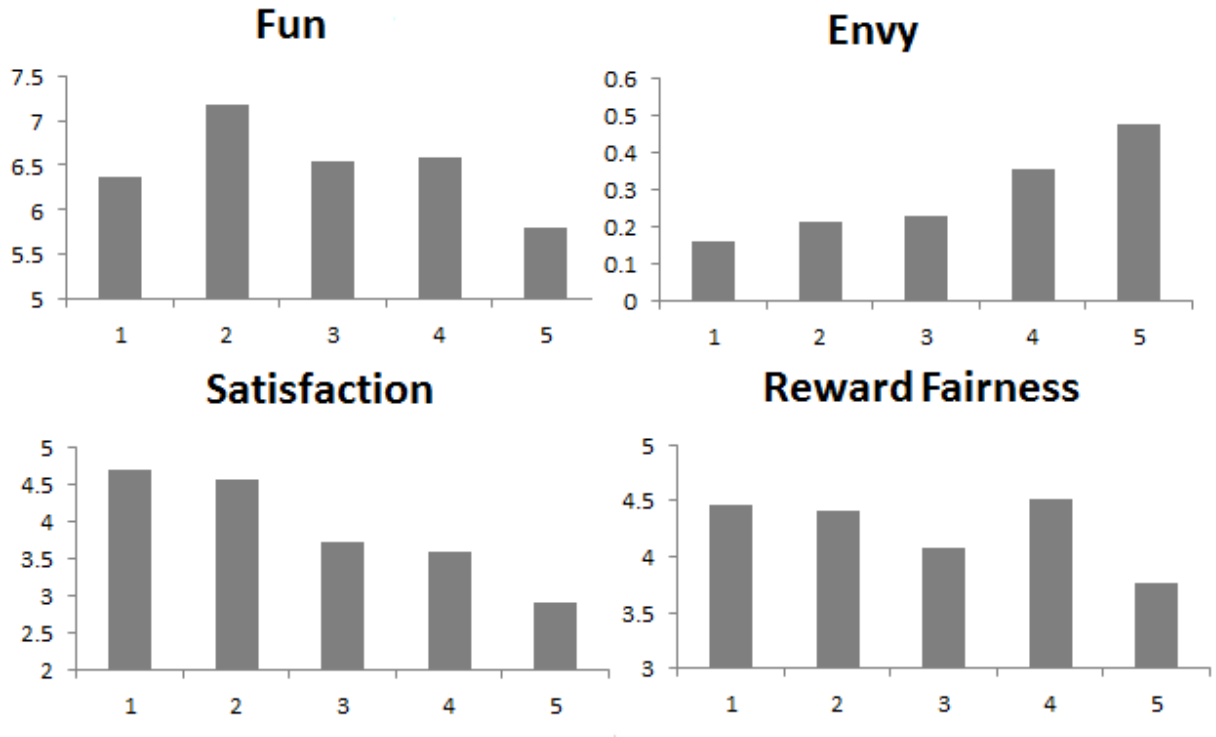
Differences Between Levels of Performance

The data shown in Figure 2 are mean values from 5 different levels of success from the most successful (1) to the least successful at (5). Each group had 5 individuals[2] they were all ranked based on their performance in each task from 1 being the best, to 5 being the

[2]For the exception of 2 groups.

worst performer in the group[3]. These are 5 subgroups based on the total rank for each participant based on the combined ranks over the 3 tasks. This can largely explain the increase in the means for reported envy left to right as participants' success levels over the three tasks decrease.

FIGURE 5.2: How Overall Rank in the Three Tasks Influence Fairness and Satisfaction



The opposite is observed for satisfaction, as the reported satisfaction decreases in line with decrease in individual success. In general satisfaction decreased as success decreased with most distributions between success levels being under 1% significance as seen in table 5.2. The exception being the success levels between 1 and 2 (high performers) and between 3 and 4 (moderate to lower performers). There is no statistically significant different within the pairs. This suggests an overall decreasing trend with some adjacent success levels not being statistically significantly different. The increase in envy as success levels decreased is not as statistically significant since the significance levels from the t-tests are mostly only under 10% compared to under 1% with differences in groups when satisfaction is observed. For envy, as further away a subgroup was from another the higher the significance level. For example, groups 1 and 5 are significantly different

[3]As mentioned in the method section there was a problem with the ranking which caused the ranking not to fully coincide with the measured performance. Although the correlation was very high.

at slightly over 3% while 3 and 5 are significantly different at 7%. Compare this with the success levels 1 and 2 or 4 and 5 in which the significance level of the difference between the distributions are highly insignificant. Generally there is a trend that envy increased as performance decreased but this trend was statistically robust as trends between success levels for fairness or satisfaction.

TABLE 5.2: T-Tests for Differences in Distributions Between Participant Performance Groups

	1v2	1v3	1v4	1v5	2v3
Envy	0.72	0.63	**0.0909***	**0.0347****	0.90
Fariness	0.83	0.12	0.79	**0.0101***	0.14
Satisfaction	0.50	**0*****	**0.0001*****	**0*****	**0*****
fun	0.11	0.84	0.80	**0.0135****	0.12

	2v4	2v5	3v4	3v5	4v5
Envy	0.14	**0.054***	0.17	**0.0672***	0.60
Fariness	0.61	**0.0109****	**0.0629***	0.20	**0.0024****
Satisfaction	**0***	**0***	0.44	**0.0028*****	**0.0606***
fun	0.20	**0.0135****	0.93	0.32	0.34

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The table shows which means are statistically significantly different from one another as seen in table 5.2.

Observing reward fairness there is evidence that the distributions for groups 3 and 5 are significantly different from the distributions in groups 1,2, and 4. That is to say it is likely the means for rank groups 3 and 5 are not in the same distribution as the means for rank groups 1,2, and 4. The distributions for groups 3 and 5 for reward fairness are all significantly under 5% except for the difference between 3 and 4 which is at around 6% and between 2 and 3 where the significance level was 14%. Groups 3 and 5 are statistically significantly different distributions at around 1% compared to groups 1,2, and 4. This indicates that although fairness and satisfaction has a very similar pattern between treatment groups, the same pattern is not as evident when comparing between different levels of success. Furthermore, there is no significant difference between the levels of fun individuals reported having and the levels of success, with one exception. This exception is between group 2, of relatively high performers, with the highest reported level of fun and group 5, the worst performers, who reported to have the least fun. The significance level between reported fun for group 2 and 5 is around 1% but this hardly shows any

trend between reported fun and performance. If anything, there is almost no relation to reported fun decreasing as performance decreasing apart from group 2 being significantly higher in its mean compared to group 5.

Differences Between Winners and Losers

Levels of fun, envy, satisfaction, and reward fairness were compared between participants who ranked first in their group 0 times (group 0), once (group 1), twice (group 2), and ranked first in all 3 tasks (group 3). The distributions here were by no means even as group 0 is by far the largest group and group 3 by far the smallest with only 3 participants in the group. These groups are referred to as win groups and can be useful to consider group 2 and group 3 as a part of the same group due to the small size of group 3.

There is no statistical difference between win groups in the level of reported fun, in fact all the means reported are within 0.4 of each other, when the mean is approximately 6.2. Although there is a steady decline in envy as the number of times a participant ranked 1st, or wins, increased. Only groups of 0 wins and 2 wins are statistically different at 5%. Participants who won every time showed no envy but this is not statistically significant in group 0 or even 1 because of the relatively small size of the sample. Thus, one can conclude that there is evidence of decreasing envy as the number of wins increases. There is significantly lower envy reported for the very successful, groups 2 and 3, compared to the unsuccessful group 0.

Satisfaction in one's own performance increased steadily from one win group to another with only group 2 and 3 not being statistically significant at least 5%, this is unclear whether it is because of the relatively small sample size in group 3, but it can be said with confidence that as success or the number of times a participant ranked first increased their self-reported satisfaction in their own performance increased with it. Lastly, results observed for reported reward fairness seem to show that for winners of 0 or 1 the reported reward fairness level was relatively similar and the same can be said for groups 2 and 3. Thus overall groups 0 and 1 are statistically different from group 2 but given the small sample size and a slightly smaller mean in group 3 they are not statistically significant to group 3. It should be mentioned however that it is likely very accurate to separate the reported fairness into a low fairness group of 0 and 1 and a high reported fairness group consisting of group 2 and 3. A similar but reverse trend was found for envy and the data is as if there is a threshold between one and two wins for both envy and fairness. There is not a clear increase from one group to the next for reward fairness as there was for satisfaction.

FIGURE 5.3: Screen Shot of the Divergent Task with Attribution

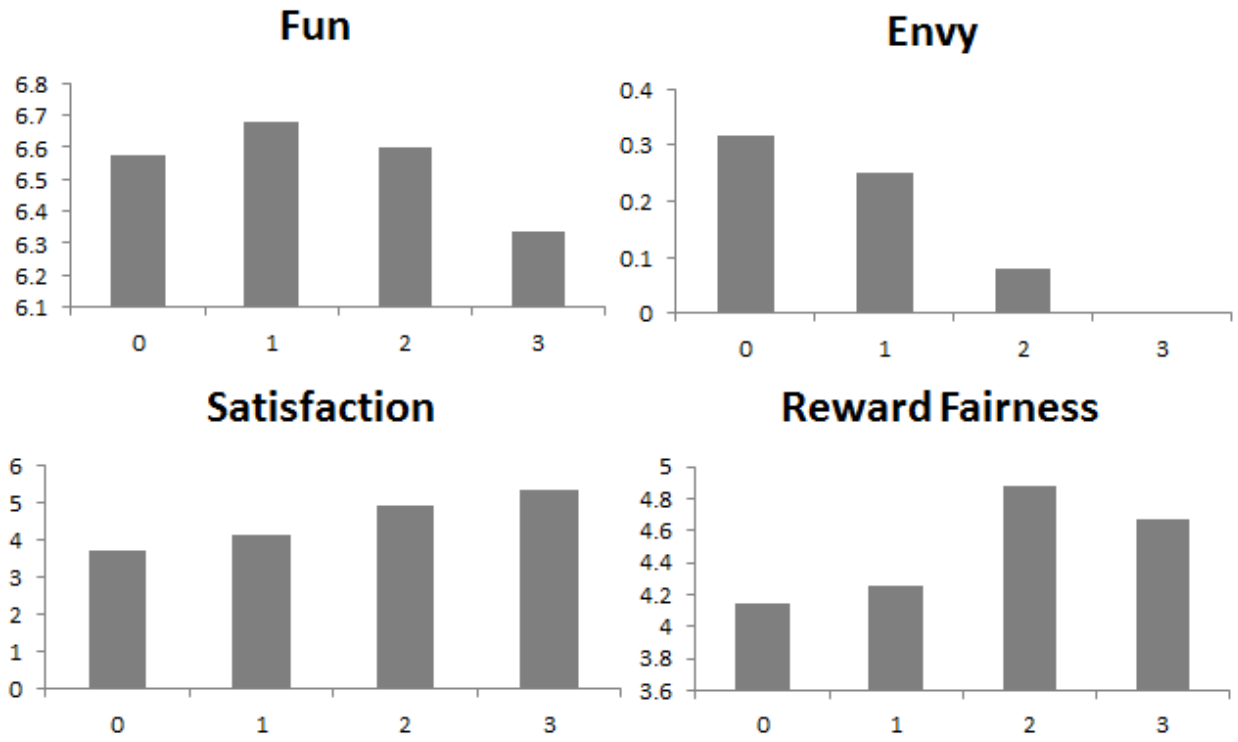


TABLE 5.3: T-Tests for Differences in Distributions between Winners
Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$.

	0v1	0v2	0v3	1v2	1v3	2v3
Envy	0.2719	**0.0385****	0.2434	0.1999	0.3457	0.5512
Fariness	0.6905	**0.001*****	0.3953	**0.0067*****	0.4914	0.601
Satisfaction	**0.0337****	**0***	**0.0169****	**0.0007*****	**0.0288****	0.4539
fun	0.8451	0.9003	0.8539	0.9815	0.8205	0.8208

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. The table shows which means are statistically significantly different from one another as seen in table 5.3.

5.3.1 Regressions for Satisfaction and Fairness

Reward fairness and performance satisfaction, based on the results, show evidence of being closely tied to each other. They both show significant decreases in both TP groups. It is difficult to know, based only on the data above, whether one is causing the other to change or if there is a possible covariant, such as pay. To find whether the two are influenced by a covariant, a regression where only the possible covariant is used to explain

changes in satisfaction and fairness could be run. Depending on the results, it would be interesting to use the IV method, if found necessary or useful, however we will readdress that later in the section. First, satisfaction can be added to a regression to explain fairness and vice versa. To start we observe if, or to what degree, does satisfaction explain fairness perceptions or vice versa.

TABLE 5.4: Fairness and Satisfaction, Including each Other and Pay Only

Reward Fairness		Performance Satisfaction	
Tournament Pay	**-0.432*** **	Tournament Pay	**-0.609*** **
	(0.145)		**(0.160)**
Controls	no	Controls	no
N	194	N	194
r2	0.044	r2	0.069
Reward Fairness		Performance Satisfaction	
Performance Satisfaction	**0.272*** **	Reward Fairness	**0.330*** **
	(0.063)		**(0.076)**
Tournament Pay	**-0.267***	Tournament Pay	**-0.466*** **
	(0.144)		**(0.156)**
Controls	no	Controls	no
Obs.	194	Obs.	194
r2	0.1301	r2	0.1511

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$.

To gain more information about a possible direction of influence between performance satisfaction and reward fairness perceptions a series of regressions are calculated. These regressions start off simple with only a few variables and step by step more variables are added to observe how significance levels of explanatory variables change and what this might tell us about the dependent variables. First we start with performance satisfaction and reward fairness regressed against tournament pay[4] or TP. This allows for a benchmark significance level and a coefficient level which can be compared to coefficient levels once a new variable is added. TP decreased both the perception of reward fairness and of the individuals own performance. These were highly significant at 1% and quite large with decreases of 0.432 and 0.609 respectively. Since both fairness and satisfaction

[4]This variable is a variable which is 1 if the individual was in a tournament pay groups and 0 if they were in a groups with a set pay.

were on a 1-6 scale the coefficients constitute about 16% and a 24% drop in fairness and satisfaction perceptions respectively.

When the satisfaction was used to explain fairness perceptions and fairness perceptions used to explain satisfaction levels, the coefficients for pay decreased in magnitude. They dropped from a decrease of 0.443 to a decrease of 0.267 when explaining changes in fairness perceptions and from 0.609 to 0.466 when explaining changes in performance satisfaction. The significance level for tournament pay explaining changes in fairness perceptions also fell to 10% significance from the previous 1%. Performance satisfaction is highly significant in explaining reward fairness perceptions at 1% SL with a coefficient of 0.272 and fairness perceptions is highly significant in explaining changes in satisfaction at 1% SL and a coefficient of 0.330. As satisfaction of one's own performance increased, the individual's opinion of the fairness of the reward scheme also improved, and vice versa. Participants in pay groups thought that the rewards were less fair compared to their counterparts in the set pay or non-TP groups. This is an intuitive interpretation and is consistent with the means observed earlier. The significance levels for all regressions are high except for the TP variable when explaining reward fairness. This is an interesting point as it would be intuitive to think that pay structure would be one of the main drivers on the perceived reward fairness.

In table 5.5 the same the regressions are the same as in table 5.4 except all 12 control variables and session dummies are added and potential changes in the explanatory variables of interest are observed. The regressions are very similar in the two tables with both tables start with tournament pay significant at 1% when explaining both fairness and satisfaction perceptions. However, the results change when the controls are added to the regression with both TP and either satisfaction explaining changes in fairness or fairness explaining changes in performance satisfaction. Tournament pay is no longer significant in explaining changes in reward fairness perceptions, although it is highly significant in explaining changes in satisfaction perceptions at 1%. TP only significantly explained changes in performance satisfaction while it no longer is statistically significant in explaining changes in reward fairness perceptions. Thus, satisfaction and the controls significantly explain reward fairness while TP, or the reward structure itself, is not statistically significant when explaining changes in reward fairness. This implies that reward fairness is explained by one's level of performance satisfaction regardless of pay structure. While one's performance satisfaction derives from both reward fairness perceptions and whether that individual in in a TP group or not.

TABLE 5.5: Fairness and Satisfaction, Including each Other, Pay, and Controls

Reward Fairness		Performance Satisfaction	
Tournament Pay	**-0.367*** **	Tournament Pay	**-0.640*** **
	(0.140)		**(0.169)**
Controls	yes	Controls	yes
Obs.	194	Obs.	197
r2	0.203	r2	0.139

Reward Fairness		Performance Satisfaction	
Performance Satisfaction	**0.289*** **	Reward Fairness	**0.390*** **
	(0.064)		**(0.096)**
Tournament Pay	-0.199	Tournament Pay	**-0.491*** **
	(0.134)		**(0.167)**
Controls	yes	Controls	yes
Obs.	194	Obs.	194
r2	0.303	r2	0.245

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis.

In table 5.4 TP is statistically significant in explaining both performance satisfaction and reward fairness when 12 controls are present. When the variable for both performance satisfaction and reward fairness are added they both are significant in explaining each other. However, TP is significant in explaining performance satisfaction while it is insignificant in explaining reward fairness. This is strong evidence that reward fairness is explained by performance satisfaction, and would indicate that differences in fairness perceptions between treatment groups are likely due to performance satisfaction and not the fact that there is a tournament pay structure. In turn, it is likely that fairness is explained by performance satisfaction and not the other way around, as the variable pay is significant in explaining satisfaction[5].

[5]The IV method was used to check if TP could be used as an instrument for satisfaction and satisfaction then used to explain reward fairness. However the results indicated that pay was not an accurate instrument, furthermore there was no endogeneity in the found in the IV regression. This indicated that a normal OLS was likely more appropriate.

TABLE 5.6: Fairness and Satisfaction. Including Each Other, Performance, Pay, and Controls

Reward Fairness		Performance Satisfaction	
Performance Satisfaction	**0.222****	**Reward Fairness**	**0.206****
	(0.094)		**(0.091)**
Tournament Pay	-0.121	**Tournament Pay**	**-0.624*****
	(0.167)		**(0.169)**
All Production	-0.016	All Production	-0.007
	(0.011)		(0.011)
Win Score	**0.461****	Win Score	-0.161
	(0.180)		(0.174)
Total Rank	0.068	Total Rank	**-0.190*****
	(0.045)		**(.043)**
Fun	**0.069***	Fun	**0.113*****
	(0.036)		**(0.036)**
Combined Quality	-0.069	Combined Quality	**0.069****
	(0.052)		**(0.034)**
Male	**-0.435***	Male	0.083
	(0.227)		(0.196)
Creative Family	**0.355****	Creative Family	-0.0739
	(0.164)		(0.146)
Ambiguous Risk	**0.008***	Ambiguous Risk	-0.002
	(0.003)		(0.003)
More in Creative Fields	**0.427****	More in Creative Fields	0.001
	(0.172)		(0.202)
Controls	yes	Controls	yes
Obs.	194	Obs.	194
r2	0.407	r2	0.493

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis.

The 3rd set of regression results, in table 5.5, show the influence of total production[6],

[6]Total number of ideas/production in both creativity tasks and he total number of math questions solved.

Win Score[7], total rank[8], fun, and Combined Quality[9]. Results indicate that reward fairness correlates with the number of times an individual was ranked 1st while overall rank was insignificant in explaining variation in reward fairness perceptions. The opposite is true for satisfaction where the total rank or overall rank was significant, while the number of wins were insignificant in explaining variation in performance satisfaction. It makes sense that an incremental increase in performance i.e. rank would increase satisfaction in one's performance. On the other hand, the difference in performance satisfaction due to the number of times an individual ranked first was not significant. This suggests the difference across the whole spectrum of performance is more significant in explaining performance satisfaction then the difference between top performers and everyone else.

The overall level of fun reported by individuals significantly explained differences in both performance satisfaction and reward fairness. The coefficient for the variable fun is positive in both cases indicating that as fun increases so does reward fairness and satisfaction perceptions. However, the direction of causality is not as clear as it is hard to say whether the level of perceived fun influences reward fairness perceptions, and vice versa. The combined quality measure[10] is positively correlated with performance satisfaction but not fairness perceptions. This is an interesting finding as the participants never received any specific feedback on how creative their output was except for indirectly through subjective judgments regarding their output which then dictated their performance. Crucially, performance was already taken into account through rank and the number of wins. This could indicate the presence of some intrinsic satisfaction generated from production of quality output. There is no correlation between quality and reward fairness perceptions and the estimated coefficient for quality when explaining reward fairness is negative and non-significant.

Overall effort in terms of output or production was not a significant indicator of satisfaction or fairness perceptions, but did have a negative coefficient as might be expected. The intuition is that the more effort put in to produce more output, the more was produced, and the lower the estimated satisfaction and reward fairness was. The estimated coefficients, although insignificant, are both negative and the same could be expected for quality. The more effort was put in, the higher the quality would be, and the lower the fairness and satisfaction perceptions would be. The logic being that higher effort, taking into account performance from total rank and winscore, would decrease satisfaction and reward fairness because individuals would be working harder for the same result. However, the results suggest this is not the case, although the coefficient for quality is

[7]Which is the total number of times the participant was ranked 1st, maximum 3 minimum 0.
[8]The combined ranks for each of the three tasks from 3 (1st in all tasks) to 15 (last i.e. 5th in all 3 tasks.
[9]This is the combined creativity scores for both creativity tasks.
[10]the combined per output creativity scores from both creativity tasks.

negative in explaining reward fairness it is again insignificant. Quality increases the satisfaction levels in one's performance and this increase in satisfaction is significant at 5% SL. This suggests that there is an intrinsic satisfaction which individuals seem to receive from higher quality production, independent of their performance in the market. Furthermore, this would suggest that the relationship between effort and satisfaction might not be the same as between effort and reward fairness perceptions.

Observing the influence of the 12 listed controls (including mathematical efficacy), none of these influenced performance satisfaction while, gender, willingness to take ambiguous risk, creative family, and more in creative fields all influenced reward fairness perceptions. This indicates that performance and perceived performance explains variation in satisfaction better compared to the controls. This suggests that performance satisfaction is explained by performance measures or perceived performance measures and individual characteristics do not influence satisfaction perceptions.

This is not the case for reward fairness perceptions. Males were found to have lower levels of perceived reward fairness with performance controlled for. Creative family, willingness to take ambiguous risk, and the confidence that the person would make more in creative fields all increased reward fairness perceptions. Interestingly the confidence that a person would make more in creative fields increased reward fairness perceptions irrespective of performance. The size of the effect was relatively large as well at 0.427 or 10% with 5% SL for the more creative in fields variable. Male, effect size of 8%, SL of 10%, and ambiguous risk, with an effect size of up to 15%[11] were significant at 10% and creative family, effect size of 7%, at 5%. These differences are interesting as they show that fairness perceptions can vary largely based on individual characteristics independent of performance while performance satisfaction is not dependent on individual characteristics. Overall the results suggest that rank, the perceived amount of fun, and combined quality of the output, along with fairness perceptions and TP explained variation in satisfaction. In addition, fairness perceptions were more likely to be influenced by ultimate success, i.e. winning, individual characteristics, and satisfaction perceptions. Which seems to suggest fairness perceptions can be more reliant on the individual compared to performance satisfaction which closely tied to performance indicators and the pay structure.

[11] This is observing a difference from the lowest level of ambiguous risk 0 to the highest at 100. The effect if 0.15% per one unit increase of willingness to take ambiguous risk.

TABLE 5.7: Fairness and Satisfaction Individually with Performance Variables, Pay, and Controls

Reward Fairness		Performance Satisfaction	
Pay	**-0.326****	Pay	**-0.576*****
	(0.137)		**(0.148)**
All Production	-0.004	All Production	-0.001
	(0.010)		(0.010)
Win Score	**0.375*****	Win Score	0.0573
	(0.130)		(0.128)
Total Rank	0.011	Total Rank	**-0.186*****
	(0.041)		**(0.040)**
Fun	**0.073****	Fun	**0.116*****
	(0.032)		**(0.033)**
Combined Quality	-0.008	Combined Quality	0.042
	(0.038)		(0.031)
Male	**-0.315***	Male	0.173
	(0.180)		0.165
Creative Efficacy	**-0.008**	Creative Efficacy	0.002
	(0.005)		(0.0057)
Creative Family	0.194	Creative Family	-0.0419
	(0.144)		(0.140)
Ambiguous Risk	**0.007****	Ambiguous Risk	0.0015
	(0.003)		(0.003)
More in Creative Fields	**0.410****	More in Creative Fields	0.211
	(0.159)		(0.176)
Controls	yes	Controls	yes
Obs.	194	Obs.	194
r2	0.302	r2	0.437

Notes: $*p < 0.1, **p < 0.05, ***p < 0.01$. Heteroskedastic Robust standard errors in parenthesis.

Table 5.6 shows which variables are significant in explaining changes in reward fairness and performance satisfaction perceptions. When reward fairness is the dependent variable, performance satisfaction is the independent variable and vice versa. This means the coefficient of the other independent variables shows how they influence the dependent variable, with their influence on all other independent variables taken into account.

To consider the controls and other independent variables influence on performance satisfaction, for example, independent of their influence through reward fairness, it is necessary to include a regression with all controls and other independent variables without reward fairness and vice versa. Table 5.7 is the exact same regression, but satisfaction is not used to explain changes in reward fairness and vice versa. The regressions in table 5.7 make it is possible to observe how variables influence satisfaction or fairness independently. This is without taking into account how said variable might influence, for example, performance satisfaction differently compared to reward fairness perceptions which what the regressions in table 5.6 do. In general the regressions are similar in the two tables except that creative family did not significant in explaining differences in reward fairness but creative efficacy is at a 10% significance level and with a 2.5% effect size[12]. These suggest that creative efficacy explains, to some extent, reward fairness, and creative family influences reward fairness significantly differently than it influences performance satisfaction. Although creative family doesn't explain changes in reward fairness without the comparison to how it influences performance satisfaction. It is also worth mentioning that individual characteristics remained statistically insignificant in explaining performance satisfaction further indicating that it is not dependent on the individual.

5.4 Discussion

In the results section there is a general overview of how individuals perceived the different market environments. These perceptions give some insight into the utility derived from these different market scenarios, which in turn will enable a discussion regarding some welfare implications of market environments. For example, interestingly the amount of fun reported was not significantly dependent on performance but was significantly lower in the TP-only treatment. Using this it could be argued that individuals derived less utility from the production process in the TP-only group compared to all other groups cet. par. The relationship between performance satisfaction and reward fairness were observed in detail to observe what drives changes in the variables and how the two might be related. Extensive literature on the relationship between satisfaction and fairness already exist, especially when observing how consumers derive satisfaction[13]. The motivation for this literature presumably being that the more is known about how consumers derive satisfaction from an exchange, the better suited a business is to deliver high consumer satisfaction and increase demand.

[12] Thus, creative efficacy does not drastically influence fairness perceptions.
[13] This literature will be discussed in detail later in the section.

The reasoning to observe performance satisfaction and reward fairness perceptions in the experiment is to be able to comment on how satisfaction and fairness perceptions are influenced by market participation. Specifically, what influences the perceptions of the producers of art or creative goods within the market? This will enable a discussion regarding how producers and consumers derive their perceptions of reward fairness and performance satisfaction, and whether there are commonalities between the ways they are derived.

5.4.1 Perceptions

The concepts being discussed are not the more general concepts of fairness or satisfaction but more specifically reward fairness and performance satisfaction. The experiment focused on the producers of creative goods and it is the producer's performance satisfaction and reward fairness perceptions which were observed. To focus the discussion, a simplifying argument is made which states that overall fairness perceptions are largely derived from the perceived fairness of the reward scheme within the context of the stylised market. In addition, the idea that satisfaction is largely derived from the satisfaction in one's market performance. The argument that performance satisfaction is similar as a concept to performance satisfaction is supported by evidence where overall satisfaction largely derives from performance. This is discussed in more detail later in the section.

5.4.2 Fun and Envy

Although fun is a purely subjective score it does give some indication of how much individuals enjoyed themselves given rank performance or treatment groups. This on the other hand can give an indication of the utility derived in varying circumstances. This is valuable information about how individuals view the market structures of the different treatment groups and whether this utility from fun correlates with measures such as reward fairness or satisfaction. Overall fun was not affected largely by performance and was relatively similar in the 4 treatment groups apart from the TP-only group. These results indicate that performance is not a major indicator of the amount of perceived fun. Anonymous competitive environment was viewed as less fun compared to completing the task anonymously with no competition or with competition among known contemporaries. This suggests that the social aspect of competition can decrease the decreased enjoyment found when individuals compete anonymously.

Performance and envy are negatively correlated, as when performance increases, envy decreases and visa verse. The control task also has the lowest reported level of envy although in general the differences are not significant between treatment groups. This

is likely due to the relatively low number of individuals reporting envy as even in the highest instance there were only approximately 30% who reported they wanted to trade places, i.e. showed envy. Furthermore, the significance levels and size of the differences were higher when observing differences in performance compared to differences in treatment groups. There were statistically significant indications that both performance measures, overall rank over the three tasks and the number of times an individual ranked first, influenced reported envy. In other words, the differences in performance within the market are more significant in explaining reported envy compared to difference between different market conditions.

5.4.3 Effort and Performance

Effort plays a role in the formation of satisfaction as effort has been found to have a negative effect on satisfaction while job performance has a positive effect on job satisfaction (Christen, Iyer, and Soberman, 2006). This however was found to be the case in a more corporate environment and might not be the case in the creative industries where individuals are often intrinsically motivated to exert effort. Effort should be considered along with job performance, or in the case of the experiment rank. However, effort cannot be directly observed, although proxies, such as, number of expressions created, or overall creativity scores can be used.

These measures only give the indication of the outcome and not necessarily effort. In addition, the measures do not give a clear sign of higher effort in the pay groups for example. If anything they would suggest that there would be higher effort in the PI groups over the 3 tasks as the first and last task both indicated a higher number of expressions[14] recorded. Thus, we can have a series of different hypothesis regarding effort, which is either based on the observed number of inputs submitted or general assumptions based on hypothetical argument.

For example, we can assume that in the public information or PI groups individuals exhibited higher effort as the inputs in those groups were higher in two out of the three tasks, this could be effort hypothesis 1. We could assume that effort is approximately consistent across groups as there is no overall difference found when accounting for measures of both quantity and quality between the groups, effort hypothesis 2. Finally, we could assume that the individuals in the TP groups exerted higher effort throughout the experiment, effort hypothesis 3. These hypotheses will be discussed in terms of their possible consequences on the interpretation of the results if they are correct.

[14]Expressions created being the number of expressions created in the creativity tasks or the number of solutions given in the math task.

Effort Hypothesis 1

Hypothesis 1 = Public information or PI groups individuals exhibited higher effort as the inputs in those groups were higher in two out of the three tasks.

If effort hypothesis 1 was to be true it would raise interesting questions about how public information about rank can influence effort, as discussed in the previous chapter. It would also render the interpretation of effort and satisfaction as negatively correlated in doubt. This is because the satisfaction levels are only significantly different when comparing TP and non-TP groups. One must remember that in the market being observed there is not a direct link between effort and performance. This is also known by the participants, which could influence the outcome. Even if effort did influence satisfaction, the expectation that effort might not correlate directly with performance, due to the subjective nature of the market, would likely dampen the effect. In addition, creative performance, which the market did not directly reward or incentivise, did increase levels of satisfaction. This effect was present even when controlling for rank and overall production. The influence of higher effort in the PI groups is likely to manifest itself through this pathway, i.e. through efforts influence on the overall creativity of output. Thus, as far as effort hypothesis 1, even though it is possibly a factor it is not influencing satisfaction through the difference between expected and observed outcome but rather through its influence on the individually perceived creativity of the output.

Effort Hypothesis 2

Hypothesis 2 = Effort is approximately consistent across groups as there is no overall difference found when accounting for measures of both quantity and quality between the groups.

Effort hypothesis 2 assumes that effort is relatively constant throughout the treatment groups. This assumption is the most likely of the three to be the case, or closest to the reality of the situation, according to the data on production and creativity scores. As discussed in the previous chapter there was no consistent difference between the groups in overall production and quality. There was evidence of the TP only groups, in some cases, focusing on quality instead of quantity in the first creativity task. In the math task TP-only group had comparatively lower scores although, and it is unlikely that there was a consistently lower effort made in any of the treatment groups throughout all 3 tasks. This is because of evidence of high output in the second of the two creativity tasks in the TP-only group. In general, however, the assumption that effort was consistent throughout

groups would indicate that satisfaction was more influenced by whether the individual was in a group with performance pay or not. This does not necessarily mean that effort is unimportant in explaining satisfaction, but it does show that the existence of performance pay can have more influence on satisfaction compared to effort. Potentially effort exerted in the pay groups was more salient for the participants as there was more at stake, this could cause the effort exerted, even though the same, costlier.

Effort Hypothesis 3

Hypothesis 3 = Individuals in the TP groups exerted higher effort throughout the experiment.

If Effort hypothesis 3 is true it would mean that the differences in satisfaction levels in the pay groups are possibly due to effort and not because it is a TP group. There is very little evidence that this would be the case since only in task 2 were the number of expressions weakly higher in the TP groups at a significance level of 10%. However, when regressing the ranks of all three tasks against the reported satisfaction, task 2 was not significant in explaining differences in satisfaction which would suggest that the influence of task 2 on overall satisfaction is small. Thus hypothesis 3 can be discarded. In the case of the research at hand there is no clear signal that effort does influence satisfaction, although there is some indication that creativity scores influence satisfaction. There is some indication that effort might indirectly influence satisfaction. However, there was not direct measure of effort and thus a comprehensive discussion on the influence of effort on satisfaction is not possible. Although it is possible to say that, it is likely that effort itself is not as significant of a factor as the influence of performance pay, if present.

There is no evidence of consistent and significant difference in performance between the TP or performance pay groups and the flat rate pay or non-TP groups. There is evidence of some performance differences between groups with and without public information (PI) where PI groups showed more focus on production, but which did not manifest in overall creativity differences. It is likely not the case that performance in terms of production or subjective performance significantly influenced the performance satisfaction of the market participant. Rather, it was the rank or given score which gave them the indication of their performance since this was the only metric which the individuals could easily observe and compare themselves to others. However, there is evidence that creative performance positively influenced performance satisfaction indicating there is, at least to an extent, an intrinsic aspect to performance satisfaction. This was the case even though individuals did not receive feedback of their creativity directly.

Satisfaction & Reward Fairness

Results regarding levels of satisfaction show relatively intuitive results. As rank performance improves, satisfaction levels improve, however the number of times an individual ranked first did not significantly explain changes in satisfaction levels when reward fairness was considered. Interestingly satisfaction regarding performance is significantly lower in tournament pay groups compared to non-tournament pay groups. This strongly suggests that, not only is performance satisfaction strongly linked to performance, but it is also significantly lower when there are monetary consequences to performance. This points to performance satisfaction being strongly linked to the consequences of the performance and not necessarily only the performance itself. This is to say everyone could have performed extremely well in each group but because success is relative and performance satisfaction was strongly linked to relative success, at least to some extent, performance satisfaction is divorced from aggregate performance. Interestingly reward fairness and performance satisfaction are also closely linked as both are significantly lower in tournament pay groups. It is not surprising that reward fairness is lower in tournament pay groups as the distribution of the rewards are highly unequal. However, the relationship between the two is important as it implies that satisfaction depends on the environment even when rank or performance is held constant.

Participants in the TP groups indicated significantly lower reward fairness perceptions compared to flat rate pay groups. Even though the average pay was identical for all treatment groups, the treatment groups with the winner takes all pay structure reported 20% lower reward fairness scores. The scores did not change based on whether there was public information but only based on the pay structure. This is also relatively intuitive because the public information condition did not change the amount of information the individual received regarding the pay structure and their own pay compared to others. The reference point or starting point has been found to be an important factor for how fair individuals thought a situation to be (Tversky and Kahneman, 1986). The reference point has also been found to be important specifically in terms of relative pay as individuals with lower pay compared to others with comparable education levels showed far lower levels of satisfaction with their pay[15] (Ordóñez, Connolly, and Coughlan, 2000).

Distributive justice, or fairness of a distribution, has also been found to be related to the level of reported satisfaction with pay level (Jawahar and Stone, 2011). This is especially relevant in winner-takes-all market structures as the might only be a very small difference in ability, if at all, between the high and the average paid. This can be especially true for the markets for creative goods where the "nobody-knows" principle influences

[15]This is to say if there are two individuals who have comparable skills or training but differ in the amount they are paid, the lower paid individual will show lower pay satisfaction.

who does and doesn't become successful. Overall procedural justice, or the perceived fairness of a process or allocation, has found to be a strong influence on satisfaction levels (Jawahar and Stone, 2011; Lau, Wong, and Eggleton, 2008; Sindhav et al., 2006). These findings are interesting in light of research which suggests that workers well-being was increased by higher levels of perceived fairness with these effects being the highest for procedural fairness (Tortia, 2006)[16]. This is interesting as there is evidence of lower workplace fairness being a negative externality of bad workplace organisation and unfair practices.

Procedural fairness perceptions are an important part of what constitutes fair, this is to say that as long as the "game" or market is no perceived to be rigged or skewed toward some group or individual, then the market or allocation is fair. However the evidence discussed earlier also suggests that if there is an element of luck or a perceived element of luck then the allocation would likely be seen as unfair. Thus the effort and talent of others needs to be observable and the outcomes need to be contingent on effort in order for the outcomes to be seen as fair. However this perception of what is fair is problematic when observing the creative industries as there is a large unknown element to success, the no-body-knows principle. Thus the market for creative goods is likely to be viewed as unfair by low performers who view success as random and not contingent on effort[17]. Thus striving for a fair allocation within the market, or a fair market, is not worth striving for due to the inherent randomness or perceived randomness of market success.

As discussed earlier in the chapter the nobody knows principle and the fact that talent is not distributed uniformly between market participants make a fair allocation and perceived reward fairness very difficult to achieve in large markets for creative goods. However these principles are not necessarily as prevalent in smaller markets. It could be that if the market is new enough that the talent pool is seen as equal in which case there is likely a feeling that individuals are starting off on the same level. Thus if there are differences in outcome it could be that these differences would be perceived to be due to effort. However the results show that satisfaction and fairness are highly dependent on performance[18] even in the small stylised market of the experiment. Performance has been found to Thus the results point to the inherent perceived inequality in the creative markets which exists even in the smaller markets.

What consequences do these results have on the utility within the market? First let us assume that both satisfaction and fairness positively correlate with utility. This assumption is not completely without support as the previous discussion did outline the strong

[16] higher satisfaction in non profits with high procedural fairness compared to profit seeking companies.
[17] At least largely not contingent on effort.
[18] Different types of performance, fairness was more dependent on how many times an individual ended up ranked first while satisfaction increased incrementally as ranked increased.

connection between fairness perceptions and well being. In addition satisfaction, almost by definition, is positively correlates with utility as it is intrinsically tied to human welfare as a concept. Effort a negative effect on satisfaction along with further evidence that performance has a positive effect on job satisfaction (Christen, Iyer, and Soberman, 2006). Thus satisfaction is maximised when effort is minimised while performance is maximised i.e. the best possible outcome for the least possible effort. There is an automatic optimisation of the allocation of effort to maximise performance. This inspires questions, such as, what happens to effort if it is hard or impossible to judge its effect on performance?

One might think that the riskier given performance level is to accomplish the lower the allotted effort is going to be. However given the discussion in previous chapters, there is significant evidence that individuals are allocating very high levels of effort into the production of creative goods. Individuals are putting in effort to the point that they are willing to use jobs outside of the creative industries in order to fund their production in the creative fields. The key here is that this effort is taking place in a winner-takes-all market with a very low probability of success in terms of becoming rich or famous. There is also evidence tournament pay inducing high effort even thought the probability of making the upper echelons of the distribution are small (ref). This high effort can, at least to some extent, be attributed to over confidence (ref). Thus it has to be so that most individuals putting in this high effort will inevitably be dissatisfied with their performance and suffer from low utility. This effort is likely increase the quality of the products available in the market and thus increases consumer utility.

5.4.4 Utility and Satisfaction

In this section the aim of the section is to discuss satisfaction and how it relates to utility. In the case of the research the variable of interest is specifically performance satisfaction and not satisfaction more generally. The discussion will start with a more general look into satisfaction, what might constitute satisfaction, and how it might relate to the economic concept of utility. The discussion will then be focused more on performance satisfaction and what aspects might influence the levels of stated performance satisfaction. Satisfaction will be discussed with reference to utility and so it is necessary to discuss utility for the concepts in the discussion to be clear for a solid base for the discussion on satisfaction.

Kahneman, Wakker, and Sarin (1996) provide an excellent place to start the discussion of utility, especially utility as it relates to satisfaction. Initially the discussion centres around what utility is thought of as by economists. They point out that initially the definition of it was focused on the subjective feeling, such as, pleasure and pain which guide an individual's decision making. This interpretation changed to utility which was inferred

from observed decisions which would then be used to explain the choices made. The two utilities were referred to as experienced utility and decision, respectively (Kahneman, Wakker, and Sarin, 1996). These concepts have also been used satisfaction research to observe how satisfaction relates to utility, and specifically how does satisfaction manifest itself in the overall discussion of utility. Satisfaction perceptions has been found to explain how well experienced utility has been maximised. This essentially means that the difference between decision utility and the experienced utility dictates perceived satisfaction (Levy-Garboua, Levy-Garboua, and Montmarquette, 2018). If experienced utility is higher than the decision utility, i.e. the expected utility from a certain decision, then satisfaction will be high, and vice versa. Similar findings indicate that a satisfaction gap, the difference between expected and actual enjoyment, dictated how much individuals were willing to pay in a pay what you want system (Rey-Biel et al., 2016). To simplify satisfaction can be boiled down to the following.

$$Satisfaction = Experienced\,Utility - Decision\,Utility$$

Where negative satisfaction is simply dissatisfaction. To use the same logic and apply it to performance satisfaction the equality can be changed to account for expected or decision utility from performance and experienced utility from performance.

$$PS = EPU - PSU$$

$$PS = Performance\,Satisfaction$$

$$EPU = Experienced\,Performance\,Utility$$

$$PDU = Performance\,Decision\,Utility$$

Thus, the proposition is that the pathways of satisfaction would be constant, but the concepts would differ slightly. This is to say that the idea that the gap between expectations and experienced outcome dictate satisfaction in different domains, be it general satisfaction or satisfaction in one's performance or purchases. The key is that the gap between expectations and outcomes dictates satisfaction. Observing the results there is evidence of a discrepancy between satisfaction levels in the pay for performance groups and the groups which received a flat rate. If satisfaction is indeed dictated by the equation above then there is evidence that individuals have either higher expectations in the pay groups, or significantly lower performance in the performance pay groups. In short the gap between expectations and reality are wider in the performance pay groups.

Based on the previous discussion on effort it is likely the case that individuals in the pay for performance groups have a higher expectation of performance compared to flat

rate pay groups. Although strictly speaking the case is more likely the fact that the performance has more salient consequences for the individuals utility.

5.4.5 Satisfaction as indicated by the Results

For a performance satisfaction gap to occur we would need to observe overconfidence or an indication that expected performance was high while the actual outcomes would be low, or visa versa. For this we observe, whether individuals thought they were more creative that 50% of the individuals and whether they thought they were more creative than 80% of the individuals. If the levels exceed 50% and 80% respectively, overconfidence can be said to exist because it isn't statistically possible for there to be more that 50% of people who are more talented than 50% and 20% more talented than 80%. Results indicate that there is overconfidence at both levels which suggests a consistent level of overconfidence[19]. Approximately 36% of participants stated to be more creative than 80% of other participants while approximately 68% of individuals stated being more creative than 50% of other participants[20].

Next overconfidence is compared to the pay-out structure which exists in the TP groups and the explicit ranking which exists in the PI groups. This comparison would suggest that, if people cared about the outcome of the experiments or tests, individuals should be exhibiting lower satisfaction in the lower ranks. This indeed is the case as satisfaction decreases as rank decreases. Interestingly the satisfaction levels in the TP groups are significantly lower than in the non-TP groups. This suggests that overall satisfaction levels are influenced by rank but are also significantly lower in pay groups, where the rank has a higher consequence on their earnings. Similar effects have been observed where under flat-rate compensation rank feedback had no effect of satisfaction but under piece-rate or performance pay satisfaction depends on the feedback about relative position (Azmat and Iriberri, 2016). In addition, as pay rank has been found to influence job satisfaction with the lower earners, people who earned lower than the median, reporting lower job satisfaction (Card et al., 2010). Although this is not strictly the case in the current research there is evidence satisfaction was significantly lower in the pay groups although performance was positively correlated with performance satisfaction in all groups.

The influence of rank on satisfaction is an interesting one and it is important to be clear about the hypothesised direction of the effect. It is hypothesised that high performance may lead to higher satisfaction, and not the reverse (Ramser, 1972). Although the relationship has also been found to be bidirectional in nature (Factor, 1982). This has

[19] Admittedly the overconfidence measures are not specific to their expected performance but they do non-the-less give some indication of overall confidence or expectation of high relative performance.

[20] Results shown in appendix.

also been supported, at least partly, by findings that satisfaction and motivation have a positive relation between each other (Snoeker, 2010). Thus exactly what influences satisfaction can be difficult to measure as positive feedback loops, like discussed earlier, can exist. Positive feedback loops, such as the previous, further strengthen the influence of performance on performance satisfaction as early success influences satisfaction which in turn positively influences later performance. This feedback loop could cause further inequality in the market as the rich or successful get richer and more successful and can make mobility within the market more difficult.

5.4.6 Fairness and Satisfaction

Based on only the results from the previous section there is evidence that there is a strong relation between reward fairness and performance satisfaction. The general relationship between fairness considerations and reported satisfaction is widely studied. The general concept of fairness was discussed earlier with the conclusion that, in the market for creative goods, it is impossible to find a "fair" or equitable allocation. This is due to the distribution within the market cannot be changed so that everyone is better off. The conditions of pareto efficiency are always violated when there is an attempt to redistribute earnings or modify the pay-out structure.

The results indicate a strong relationship between reward fairness perceptions and performance satisfaction. Existing literature shows a strong causal link between fairness perceptions and perceived satisfaction (Alesina and Angeletos, 2005; Lau, Wong, and Eggleton, 2008; Tortia, 2006). This is interesting especially as the results suggest this is only the case when performance pay is present, which would strongly suggest that there is a relationship between rewards fairness perceptions and the satisfaction in one's own performance. This effect is present even when multiple performance measures are controlled for. The consequences of this relationship on the individuals experienced are not as clear as the reported level of fun were not influenced as strongly by the existence of performance pay. The TP-only groups showed significantly lower fun compared to all other treatment groups, thus there was no consistent effect of tournament pay on the reported levels of fun. This would suggest that even though satisfaction was lower it does not necessarily mean that overall experienced utility was lower in those groups.

Fairness and satisfaction have been found to show similar "loss aversion" characteristics to what is detailed in Kahneman and Traversky's Prospect Theory in 1979. Specifically, the pain associated with receiving a lower salary was greater than the pleasure associated with receiving a higher salary but with the same magnitude of difference to the reference salaries. The same study also found that if a salary was lower than the reference salary it was viewed as much less fair while if the salary was higher by the

same magnitude it was only seen as less fair (Ordóñez et al., 2009). These findings are in line with later findings from paper by Traversky and Kahneman 1986 which found that individuals used a reference point to compare outcomes to, and this reference point could be manipulated using framing (Tversky and Kahneman, 1986). Thus, there is a strong indication that the reason there is a difference in satisfaction is that there is a difference in the frame of the experiment such that there is an increase in an individual's expectations of success overall. In turn this would increase the gap between experienced performance utility and performance decision utility which is highly dependent on the expectations set. Since there was no difference in relative rank between treatment groups the difference in expectations between these groups would cause the observed difference in performance satisfaction levels.

Finding that fairness perceptions are related with job performance might not on their own be surprising. However, uncertainty has been found to moderate the positive relationship between job satisfaction and job performance, as uncertainty rises the stronger the relationship between job performance and job satisfaction (Diekmann, Barsness, and Sondak, 2004). This would suggest that not only was the stylised market seen as quite uncertain as there was a strong link between the two, but also that decreasing this uncertainty could have positive influences on the willingness to take part in the market for creative goods as a producer.

What policy makers can do in terms of fairness is to focus on a level playing field between market participants where there is not systematic bias toward any group of market participants. For example, a policy objective which could increase fairness within the market would be to guarantee the possibility of moving up the hierarchy of the payment distribution by working for an egalitarian market set up as possible. Copyright is seen as violating this egalitarian market competition by allowing for a monopoly of an expression which can tilt the market or game in the favour of the copyright holder. This is evident in the discussion of copyright consequences in chapter 1. This is claim does have support in existing literature which highlights the importance of procedural fairness perceptions on satisfaction (Alesina and Angeletos, 2005; Tortia, 2006). This could potentially also be extended to the bargaining situations within the market so that systematic differences in bargaining power which could manifest "unfair" outcomes could be minimised when possible to do so without distorting the market.

Fairness, and in this case reward fairness, does influence the market experience indirectly. Fairness perceptions influence job satisfaction within the market through two general processes, one is through outcomes, the other through trust in the superior or organisational commitment (Lau, Wong, and Eggleton, 2008). This further supports the claim that a "fair game" or equal opportunity in the market is critical as the role of the

organisation is to maintain advancement possibilities in to secure high productivity and satisfaction. Otherwise there is a risk that the individual will think that their effort is not likely to be recognised in the form of a raise or increased opportunity and thus put in less effort (Perista and Quintal, 2010).

In the context of copyright policy this is crucial as there is a distinct conflict between securing a motive to create through copyright and incentivising future after the copyright because the copyright itself restricts future creation and potential sequential innovations based on the copyrighted work. There conflict between the constituents at the top of the hierarchy who have the motive to monopolise the market and the constituents at the bottom of the hierarchy who want open access to increase the possibility to innovate and carve up their own peace of the market. It is best for the market for these two forces to be in equilibrium where no one force is controlling the market to maximise the incentive. If there is a monopoly then the market is inaccessible and there exists no motive to create, while if there is no way to carve out market share it is equally catastrophic to the motive to create. The main aim of policy should be to work toward a level or fair playing field between the two forces are in an equilibrium where it is possible to carve out some market share but impossible to force out competition which inevitably works to promote innovation and overall welfare. Although some suggest that fairness may be tempered or decreased by the fight to survive in the market (Schotter, Weiss, and Zapater, 1996).

5.5 Conclusion

The chapter has focused on the copyright markets and how individual perceive such markets. The focus was largely on satisfaction and fairness with mentions about envy and perceived fun. There is a strong relationship between satisfaction and fairness perceptions where fairness perceptions are found to positively correlate with satisfaction (Sindhav et al., 2006; Christen, Iyer, and Soberman, 2006). Although these might not sound like terms economists might be interested there are studies in economics which indicate they have very real consequences for individual utility and so have very real economic consequences. Low job satisfaction, for example, can cause individuals to decrease effort or even quit a job (Mitchell and Albright, 1972; Devonish, 2018; Eidukaite, 2016; Perista and Quintal, 2010). These studies are largely done with organisations, but the results translate to the largely freelance world of the creative industries as well.

The results discussed in earlier sections indicate there is a lower level of satisfaction in pay for performance treatment groups. Suggesting that this type of pay structure could suffer from lower effort and even higher rates of turnover compared to a flat rate pay

structure in the long run. These lower levels of satisfaction strongly correlate with reward fairness. These results strongly mirror similar findings in business organisation and consumer research reaffirming the relationship between fairness and satisfaction. Interestingly however the relationship was only present with performance pay and not when there was fixed rate pay. This is not to say satisfaction was only tied to performance when performance pay was present, as similar effects took place in non-performance pay groups. However the overall satisfaction level was lower in the performance pay groups. This strongly points to reward fairness perceptions strongly influencing the individuals satisfaction levels. There is strong evidence that lower satisfaction in performance pay groups is an economic reality which is likely to also influence individuals effort and production decisions in the long-run.

Ensuring that there are more than just the market to fund projects involving creativity, and which extends to innovation more generally, has a clear advantage. As discussed in Klamer 2007 it is important to have different funding methods for the arts. The paper focuses on three main methods: First. The market, second. Government grants, and third. Patronage (Klamer and Petrova, 2007). The third, patronage, is fast becoming popular even as a funding method/opportunity as sites, such as, Patrion or GoFundMe connect interested patrons with creative types and innovators. One can go out on a limb and say that the market for creative and innovative goods will always exists. Public funding for the arts is highly dependent on the country and sometimes even which party power. However, results in this chapter and in existing literature on satisfaction do suggest that a fixed or flat pay can work to increase satisfaction levels and influence effort and retention of talent within the market.

If there is an effort to have some grants in these markets it could work to help retain talent in the market who, might otherwise exit the market, and who have experience and skills from previous involvement in the market. This could help to provide a wide range of possible funding sources and help to increase creative production. In terms of copyright policy the best government can do is to balance the monopolising aspect of copyright with its incentivising aspect in order to provide a level playing field for incumbents and new market arrivals where the two can compete fairly. There is evidence this is not the case as copyright terms are sub optimally long (Pollock, 2009). There is even some evidence that disregarding copyright could increase overall welfare (Handke, 2010). Hence a more flexible or industry specific copyright could also be beneficial as the blanket incentive is inflexible.

Chapter 6

Conclusion

The results gathered will be discussed here in terms of their contribution to the existing research and how they are relevant toward the analysis of markets for creative goods. The methodology is discussed and a case made for the legitimacy of the methodology as an instrument to study the markets for creative goods. This is relevant specifically to the markets for creative goods, as they exhibit unique production processes which rarely exhibit the same mechanical production process found in more traditional markets for goods. Obviously there is a spectrum of different types of goods, from music for example, which is produced once and then copied multiple times as compared to a painting, which is one of a kind and not reproduced[1]. The heterogeneous nature of the market is likely a reason why the experimental method is not widely used, as it can be difficult to generalise results from experiments. However, it will be argued that the methodology can offer new insights into markets for creative goods research.

The research presented in this thesis is most relevant to the field of applied or empirical economics. Although the methodology is heavily influenced by copyright and more generally the philosophy behind intellectual property law, the thesis contribution lies largely in the methodology created and used for the purposes of the thesis. Though the results lacked conclusiveness, they did show potential for a research agenda in the empirical research on copyright law and related markets. Issues such as the small size of the sample caused the results to lack the statistical strength necessary for stronger more definitive results. In addition, a field experiment or a natural experiment coupled with results from an experiment with more conclusive results would be necessary for any robust policy recommendation to be possible. There is some indication that both pay structure and the availability of information regarding the actions and performance of other competitors can influence creativity. There is even evidence that there is some interaction/crowding out of these incentives, where pay structure on its own influence production/creativity but would not necessarily have the same effect when combined with the availability of information.

[1] There are prints and pictures of the painting but these can be convincingly argued to be separate goods.

These results are not definitive but rather should be viewed as feedback about the methodology. This feedback indicates that if some of the weaknesses, such as sample size, were the methodology would have a good chance of producing statistically stronger results. Different disciplines of research in the social sciences can have a different view of what constitutes a contribution to new knowledge. The interdisciplinary nature of the research presented requires some discussion in order to gain perspective on what is considered a contribution to new knowledge in each discipline. It may also highlight where and why there are differences in the way the problems of motivating creativity and motivation more generally would be viewed between the disciplines. The philosophy of two important disciplines to this thesis, economics and law, will be discussed in the context of the scientific philosophy of Karl Popper, Thomas S. Kuhn, and Imre Lakatos and how they relate to the creation of knowledge in economics, law, and the economics of law. This discussion is designed to give a general context of where this research might fit and what its contributions might be within these disciplines.

6.1 Scientific Philosophy of Law and Economics

In previous sections there has been discussion about the philosophy behind the utilitarian justifications for copyright and Lockean labour theory in common law countries versus the Kantian natural rights justifications for copyright in civil law countries. Philosophical differences between the fields of economics and law offer a good window into how the fields differ in their approach to science. Key scientific thinkers, such as Popper, Lakatos, and Kuhn, have greatly influenced the way researchers approach the scientific method and what method or knowledge is considered to be "scientific".

Karl Popper argued for what was called 'falsification', essentially stating that proper scientific method allows for a theory or hypothesis to be falsified, i.e. a theory is set out so that is can be proven wrong or 'falsified'. The reason falsifiability was important to him was because it did not allow for the theory to be circular and thus allowed it to be open to scientific scrutiny (Popper, 1992, p. 32-42). As a continuation of the falsification principle and as a key part of scientific honesty, Popper argued that it was important for authors to specify in advance under which conditions the authors would be willing to give up their theory (Lakatos, 1978, p. 125; Popper, 1992, p. 198-199). Popper also warned that the 'classical' system might not be taking evidence against their theories into consideration or were disregarding their findings using ad hoc adaptations of their theory. Here Popper advocated that the scientific community hold on to the idea of falsification (Popper, 1992, p. 59-60). The main focus of these theories is to create some guidelines for a generalised scientific method so that the same formula can be used to create new scientific knowledge.

This is especially important when compared with the circular arguments, which cannot be proven wrong and are similar to a belief which cannot be scrutinised for its reliability like a falsifiable theory or statement can.

Thomas S. Kuhn had some ideas about scientific knowledge differing from Popper's, and his approaches leaned heavily on the idea of consensus in the scientific community and the history of scientific knowledge. There was great focus on what he called paradigms[2] and how they changed within a paradigm, according to what he termed 'normal science', and how one scientific paradigm changed to another, a phenomenon he referred to as a 'revolution'. When referring to normal science, Kuhn emphasised the role of history and the scientific community in the progression of science. He stated that normal science was research based on historical scientific achievements which the given scientific community has acknowledged as the foundation for further scientific discovery (Kuhn, 1970, p. 10). Note the role of the scientific community as the gate keepers of new knowledge, since without the acceptance of the scientific community something cannot or should not be considered science according to Kuhn. For Kuhn a revolution was a significant shift resulting in a new paradigm that changes the most elementary theoretical generalisations, paradigm methods, and applications in the field (Kuhn, 1970, p. 84). This type of change within a field indicates a developmental pattern of a mature science (Kuhn, 1970, p. 12). However, he did also comment that paradigm shifts were unlikely to be quick and used quotes by Max Plank and Darwin to support his point that these changes were likely to come about when the new generation of scientists took over from the established scientific community (Kuhn, 1970, p. 151).

The writings of Imre Lakatos can, at least in some respects, be viewed as a middle ground between Kuhn and Popper. Lakatos rejects Popper's ideas about falsifications through a crucial experiment, stating that what distinguishes science from pseudoscience is the scientific method not the theories. Thus, an important aspect of science is not the theories but the method when deciding if something is science or pseudoscience. He continues by arguing that scientific achievement is not an isolated hypothesis but rather a research program with a core law or theory and a protective belt of auxiliary hypotheses (Lakatos, 1978, p. 4). Thus, he emphasised the research program over the singular hypothesis or theory and promoted the idea that a research program is not singular but rather a body of work. This line of argumentation is strengthened by the statement that there is no 'revolution' as Kuhn suggested, no 'crucial experiment' falsifying a theory as suggested by Popper, but rather an evolution of a research program being taken over by another over time (Lakatos, 1978, p. 6). However, he does not completely refute Kuhn's

[2] An example of a paradigm could be the focus on Newtonian physics pushed aside the previously prevailing theories on motion and energy. This shows how the field of physics moved from one paradigm to another caused by new and accepted discoveries in the field.

theories, as he does view history and science as important and largely agrees with Kuhn on the idea that programs develop or 'problem shift' similarly to the Kuhnian idea of normal science or changes within a paradigm (Lakatos, 1978, p. 46-47). However, Lakatos did show apprehension about Kuhn suggestion that the scientific community should be the judge of research programs, through historical examples Lakatos cited, such as when the scientific community argued against Galileo's laws of free fall and Newton's theory of gravitation (Lakatos, 1978, p. 86). Finally, Lakatos argued against the idea of a demarcation rule, i.e. conditions which, if met, would lead to a theory being 'falsified' in the eyes of the creator. Lakatos argues that some of the best scientific achievements were 'unscientific' continuing that demarcation criterion are difficult, if not impossible, for the author of a theory or research program to set out in advance (Lakatos, 1978, p. 146-148).

6.1.1 Philosophy of science, Economics, and Law

This discussion focuses on Popper because his scientific philosophy of falsification is a key aspect of the criticism by many economists of theories in the field of law. These philosophical arguments relate also to the argument that the economics of law is a positive or normative science, as it is argued that the field attempts to align itself with the natural sciences but fails in this as a science because their theories are not falsifiable and thus not positive or Popperian (Crespi, 1991). Similarly, it is argued that prominent authors in the field of the economics of law often violate the falsification criterion and cannot be considered science if Popper's criterion is applied (De Geest, 1996). The author continues by citing the philosophy of Lakatos and Kuhn and noting that, even if a part of a theory can be falsified, it can still be considered to be science because it can be a part of a larger program of scientific enquiry (De Geest, 1996). Economics is generally closer to the natural sciences than the approach generally taken in the field of law[3] (Posner and Parisi, 2016b, para. 2; Hovenkamp, 1990; Friedman 1953 p. 3-43). Economics[4] is not, at least not uniformly, considered a Popperian science due to its unrealistic assumptions and perceived reliance on universal statements that cannot be observed empirically (Rowley, 1981; De Geest, 1996). The realism of the arguments themselves is not necessarily relevant either, as it can be argued that it is enough that they cannot be subjected to empirical testing, that this in itself makes it non-scientific from the Popperian perspective (Jackson, 1984). Although there remain questions about the feasibility of the use of falsification and the Popperian approach, this has been found to remain a popular philosophical backdrop for the economic approach (Caldwell, 1991). The Popperian approach in the economics of

[3]The authors specified Anglo-American law traditions in this case is Popperian or positivist
[4]Thus also neoclassical law and economics

law derived from its use in economics, even though there remain doubts about its appropriateness in the field[5].

The theories of Kuhn and Lakatos can be viewed, at least to some extent, as a reaction to Popper's philosophy of falsification and demarcation. Legal research methodology can be thought of as being Kuhnian paradigmatic process (Salzberger, 2007). This is very different compared to the Popperian approach of Friedman and wider economics literature. To some extent this juxtaposition of the philosophy of law and economics shows the difficulties of interdisciplinary research in the two areas, as it is hard to adjust research to fit opposing philosophical backgrounds. Kuhn has been criticised when discussing the methodology of economics because of his seemingly 'ambiguous' concepts of the paradigm and the shift or jump from one paradigm to the next. The author continues by leaning towards the philosophical approach taken by Lakatos as a more appropriate approach for economics compared to Kuhn, in general viewing Lakatos as a mixture of Popperian and Khunian philosophies (Blaug, 1975). However, the philosophy of Lakatos is not necessarily seen as appropriate for economics due to its inability to accommodate the demands of elegance on the construction of economic theory (Khalil, 1987). In fact, some go even further and state that the Popperian, Khunian, and Lakatosian approaches used to justify the research methods used by legal economics all have major shortcomings (De Geest, 1996). While others argue that the economics of law is still quite a new field and is in a pre-paradigmatic stage (Boumans and Davis, 2015, p. 116).

The Popperian view of falsification can be seen as a hard and fast rule for the judgment of scientific truth, which is why it is quite an attractive rule to use. The problem is that it is as if scientists using the Popperian approach are assuming the existence of an absolute scientific truth. That all contributions which do not strictly conform to the Popperian standard would be untrue or worth excluding from the conversation. Kuhn takes into account the gray area of knowledge in his idea of a research program which includes the history of knowledge to create scientific knowledge. The problem here is that in order for new knowledge to be considered scientifically legitimate ,there must be consensus among the scientific community. This in turn is a problem due to the tendency of the scientific community to be dogmatic, as pointed out by Lakatos when referring to the example of Galileo (Lakatos, 1978, p. 86). Thus, the creation of knowledge is much like a Foucault-like discourse, as described by Lakatos, where arguments evolve and only the strongest arguments survive the test of the discourse.

It may be difficult to pin down the appropriate philosophical approach in analysing

[5]It should be said that not all of economics is Popperian, but there is a general tendency in that field to adopt the Popperian approach.

scientific rigour or even the legitimacy of theories. A large reason for the heated debate seems to be the clashing of underlying philosophies within the different schools of thought which ultimately seem to conflict with ideologies held by researchers in different fields. Thus, to some extent the philosophical discussion has more to do with the justification of a methodology or school of thought as science or as compared to a true philosophical discussion on the reliability of the underlying science or knowledge created. This is the philosophical context which this thesis attempts to fit into by combining approaches from fields with very different philosophical backgrounds into a method combining knowledge from all related fields into a new potential research program. This is done by carefully combining aspects of different fields and carefully justifying the approach as demonstrated in section 3.

The contribution of this thesis fits best into the field of experimental/empirical economics, where the method used to recreate a dynamic market is new. In a Popperian sense the results of the research do not unequivocally falsify existing theories of the role of incentives such as public information or tournament pay on creativity, although some perspective can be gained on the topics. It is not clear that the research fits directly into a Kuhnian type of paradigm either because it is so recent and because of its interdisciplinary approach makes it hard to fit into an existing research program. However, this research does contribute to the general discussion of how interdisciplinary research might be conducted, the key contribution being the methodology of creating a stylised market for creative output, as well as for other applications. This contribution is closest to a Lakatosian contribution to a research program of experimental economics more generally. The key contribution of the results in this thesis is to contribute to the discussions taking place on the role incentives such as, public information and tournament pay play in creative performance. Some results do support existing research programs which in turn support the legitimacy of the methodology, as it can be used to reproduce existing findings and so contribute to existing research programs.

6.2 Results

6.2.1 Creative Output in a Market Context

Although the evidence was not conclusive there is some evidence that public information or attribution was important to market participants, as it in some cases incentivised higher production and in other cases deleted an effect which was present when only tournament i.e. economic rights was present. However, the results were not strong enough to base theories or any policy recommendations on them but rather showed that there is

evidence of effects which could be stronger if a second improved version of the experiment is run with a larger population. There was some indication that public information can influence how individuals compete in the market, as under the public information conditions individuals tended to focus on increasing production or market share. These incentives can influence decision-making and concern for reputation can drive individuals to want to protect their ideas and for these ideas to be presented in certain ways. These results have no direct parallel in existing theory. Hence this an avenue through which this thesis shows potential for a new research agenda in the future. There are comparative studies on the influence of attribution rights has been found to influence the willingness to sell a good even taking into account the endowment effect Buccafusco and Sprigman, 2010. The experiments in this thesis do show evidence that public information[6] influenced creative production by influencing how individuals compete in the market. These findings support the findings Buccafusco and Sprigman (2010) showing that creators do place importance and even value on attribution. Similar results were found in Marcin and Nicklisch (2014), findings indicated that there is an endowment effect when default rules exist, of which attribution rights could be one. The results from existing studies and the results in this thesis support further research on the effect of public information and attribution on the market leading to efficient market outcomes.

6.2.2 Satisfaction and Fairness

Fairness perceptions were clarified in the experiment, not only by performance measures, but also by whether individuals thought they would do more in creative fields and if they had family working in the creative fields. The results indicated that perception of fairness are dependent on performance to some degree but is significantly influenced by an individual's familiarity with the creative fields. However, satisfaction which was affected only by performance measures is highly performance dependent but unaffected by differences between individuals and fits in with the theory proposed by Kahneman, Wakker, and Sarin (1996). The authors outlined their proposal that satisfaction is the difference between actualised utility and the expected utility Kahneman, Wakker, and Sarin (1996). The lower satisfaction in performance pay/economic rights groups suggests that individuals experience lower utility which may be caused by overconfidence in their potential for success, as their expected utility was higher compared to treatments with no performance pay. This can explain to some extent the oversupply in creative markets, as there is evidence there could be systematic overconfidence by creators. This could cause

[6] i.e. Public information was the variable used to model the attribution right

the market to be filled mostly young artists, as the older artists might leave after a period of low satisfaction as discussed in chapter 5.

6.3 Contribution

The results were not conclusive but do show potential for a future research program and for methodology utilising a lab experiment with a dynamic market mechanism. Overall there is some support for the theory that there should be an array of funding options available to creators. This would provide the freedom of the market but also with possible support from grants and patrons as forwarded by Klamer and Petrova (2007) can also decrease market turnover and provide an incentive for more experienced market participants to remain in the market. Since the results were not consistent between tasks, the findings also indicated that copyright is not a singular incentive with a universal effect on all production in the creative industries. Rather there was evidence that incentives provided by copyright can influence markets in various ways depending on the task or markets type.

The discussion on satisfaction and fairness does support findings in existing literature and does provide interesting results on how the market structure influences the individual experience. Satisfaction was shown to be highly dependent on performance and the pay structure, which indicates that there were lower levels of satisfaction in tournament pay groups, which decreased the overall experienced utility. This was likely due to the participants' overconfidence in the probability of their success as deduced from survey results. The findings support existing theories on the potential overconfidence in artists in the creative industries (Abbing, 2011, p. 199). Although the results are interesting the most significant contribution of the thesis is the experimentation with the experimental methodology. The methodology explores how a dynamic market can be created and highlights how this could be done. This provides potential for a research program that can work toward simulating more effectively markets such as those affected by copyright. This methodology can be expanded to lab experimentation aiming to simulate dynamic markets more generally.

Appendix A

Chapter 3 Appendix

A.0.1 Controls

Controls Used in All Regressions

Variable	Reason	Cite
Creative Efficacy	Confidence can correlate with creativity	Bandura (2006)
Risk Taking Behaviour	Risk attitudes correlate with pay preferences	Niederle and Vesterlund (2007)
Ambiguous Risk	Creative Market exibit ambiguous risk	Charness and Grieco (2014)
Handedness	Left handedness associated with creativity	Wolman (2012), Coren (1995)
Creative Family	Environment has a large effect on creativity	Hennessay (2010), Abbing (2010)
More in Creative Fields	Do people think they can make more in arts?	Abbing (2011)
Famous Due to Art	Do people want to become famous due to art?	Abbing (2011)
English Speaking	Performance can depend on language skills	
Age	Age can affect creativity	
Institution Dummy	Environment has a large effect on creativity	Hennessay (2010), Abbing (2010)
Art Hobby Dummy	Can be a proxy for intrinsic motivation	

A.0.2 Multicollinearity Checks

The VIF or variance inflation factor test was used to test for multicollinearity i.e. a VIF over 2.5. There was high multicollinearity in some session dummies and the interaction term between ER and AR. The multicollinearity in the interaction term (AR & ER) can be ignored as the multicollinearity does not affect the p-values. Also the collinearity in the session dummies can be ignored as they are not variables of interest.

TABLE A.1: VIF For all Controls When Regressed Against Total Creativity

Variable	VIF	1/VIF
Tournament Pay Only (TP)	2.26	0.44208
Public Information (PI)	2.18	0.459513
PI \& TP	3.27	0.305454
Male*	1.13	0.882681
Creative Efficacy Score	1.12	0.895425
Creative family Members*	1.09	0.918787
English Speaking*	1.14	0.877044
Risk Aversion	1.09	0.918026
Willingness for Ambiguous Risk	1.14	0.877584
Righthanded*	1.61	0.622374
Prefer to be Famous not Rich*	1.11	0.898809
Earn More in Creative Industries*	1.17	0.856625
Artshobby*	1.28	0.77854
GSA*	1.41	0.710972
Session 1*	2.32	0.431188
Session 2*	2.47	0.404466
Session 3*	1.88	0.532519
Session 4*	2.21	0.451509
Session 5*	1.86	0.537168
Session 6*	2.54	0.394101
Session 7*	1.88	0.532972
Mean VIF	1.72	

* Denotes dummy variables

TABLE A.2: VIF For all Controls When Regressed Against Total Solved with Both Ranks

Variable	VIF	1/VIF
Session 6*	2.77	0.361149
Session 2*	2.6	0.384615
Session 1*	2.4	0.416685
Session 4*	2.22	0.450765
Session 3*	1.94	0.515275
Session 8*	1.89	0.530403
Session 5*	1.88	0.530777
Public Information (PI)*	1.62	0.616604
Tournament Pay Only (TP)*	1.62	0.617118
Righthanded*	1.58	0.630917
PI & TP *	1.56	0.640882
GSA*	1.44	0.696369
Arts Hobby*	1.27	0.786777
Age	1.26	0.79539
Creative Efficacy Score	1.21	0.827462
Willingness for Ambiguous Risk	1.2	0.834397
English Speaking*	1.2	0.836371
Prefer to be Famous not Rich*	1.17	0.852827
Male*	1.15	0.87118
Earn More in Creative Industries*	1.15	0.871712
Figural Task Rank	1.14	0.876648
Risk Aversion	1.12	0.88891
Divergent Task Rank	1.11	0.898987
Creative family Members*	1.09	0.917417
Mean VIF	1.57	

* Denotes dummy variables

A.0.3 Random Allocation Check

TABLE A.3: Correlation Between Treatment Groups and Individual Characteristics

	Treatment Group
Treatment Group	1
Age	-0.05
Male	0.1173
Institution	-0.0099
Year of Degree	0.0288

There is a relatively strong correlation between being male and being in a group with economic rights.

A.0.4 Pre Experiment Survey

Entry Survey

N.B. The participants will see this in a program with dropdown menus and proper examples and so it is visually easier to understand. The participation in this experiment and questionnaire is optional and the participant can withdraw at any point, no questions asked. It should take around 5 minutes to complete. All information will be kept confidential and is for research purposes only. Your answers matter to us and help improve our research.

1. Age = _____

2. Gender Identification = _____

3. Do you think you are more creative than 80% of your fellow art students the room? (yes/no) ____

4. Year of current Degree = _____

5. If you had to choose between being rich or famous as a result of the art you create, which would it be?

a. Rich

b. Famous

6. Do you think you are more creative than 50% of your fellow art students the room?
   a. Yes
   b. No

7. Imagine you are presented with the opportunity of taking part in a coin toss. You are given six different options for how you will be paid depending on if it is heads (low) or tails (high). Which option would you choose? (choose only one)

Choice of outcomes	50% Low	50% High
Option # 1	£28	£28
Option # 2	£24	£36
Option # 3	£20	£44
Option # 4	£16	£52
Option # 5	£12	£60
Option # 6	£2	£70

8. Imagine that tomorrow you are seeking a job outside the arts, for example, accountant, social worker. Please use the following scale to indicate your confidence from 0 to 100 in relation to each question.

0 10 20 30 40 50 60 70 80 90 100
Cannot Moderately highly certain
do at all Can do can do

	Confidence (0-100)
Requesting a job application form.	____
Completing a job application form.	____
Producing a curriculum vitae (CV).	____
General interview skills.	____
Oral self-presentation at the interview.	____
Meeting new people.	____

Contributing to a work related meeting or discussion. ____
Working with a team. ____
Working on your own. ____
Career progression. ____

9. Please use the scale to answer how confident you are about the following statements. Assume the maths being referred to consist of only addition, subtraction, multiplication, and division problems.

0 10 20 30 40 50 60 70 80 90 100
Cannot Moderately highly certain
do at all Can do can do

Confidence (0-100)

I'm confident that I can do an excellent job on my maths tests. ____
I'm Certain I could understand the most difficult material presented in math textbooks. ____
I am confident I can do an excellent job on my math assignments. ____
I am certain I can master the skills taught in my math class. ____
I'm confident I can understand the most difficult material presented by my math teacher. ____

10. Please use the following scale to answer how confident you are about the given statements.

0 10 20 30 40 50 60 70 80 90 100
Cannot Moderately highly certain
do at all Can do can do

Confidence (0-100)

I feel that I am good at generating novel or innovative ideas. ____
I am good at finding creative ways to solve problems ____

I have confidence in my ability to solve problems. ____
I have a knack/skill for further developing the ideas of others. ____
I feel that I am more creative than others on my course. ____

A.0.5 Post Experiment Survey

Exit Survey

The participation in this experiment and questionnaire is optional and the participant can withdraw at any point, no questions asked. All information will be kept confidential and is for research purposes only. Your answers matters to us it would be appreciated if you would take the time to answer all questions.

11. Do you have any siblings or close family members working in the creative industries (movies, tv, writer etc.)?

_____

12. Have you been to an art school before the institution you attend now?
    a. Yes
    b. No

13. Have you gone to a Steiner School or a Waldorf school? _____

14. Do you think you could make more money in the long run if you chose a field outside of the arts (for example, student of non-arts or an alternative career) compared to a career in the arts (painter, musician, etc).
    a. Yes
    b. No

    14b. If yes, give your best estimate of how much more do you think you could earn per year in pounds? _____

15. Please list any previously earned graduate/university level degrees.

_____

16. How satisfied are you with your overall performance in the experiment?
    a. Very satisfied
    b. Satisfied
    c. Quite satisfied
    d. Quite unsatisfied
    e. Unsatisfied
    f. Very unsatisfied

17. Which country and city did you grow up in until you were 18? (please indicate country or countries along with an approximate postcode)

_____

_____

_____

18. Assuming you gain £200 would you prefer to... (Choose the preferred answer)
    a. Have a 50% chance of receiving £300 and a 50% chance of receiving £100
    b. Have a 50% chance of receiving £400 and a 50% chance of receiving £0
    c. Have a 10% chance of receiving £1500 and a 90% chance of receiving £0
    d. Stay at £200

19. Assuming you could risk up to £100 but the probability of winning would be unknown, how many pounds of the £100 would you be willing to risk? _____

20. Which would you prefer?
    a. Receive £180 with a 100% probability
    b. Have a 50% of winning £400 and a 50% of receiving £0

21. How much fun did you have or how much did you enjoy the experiment from a scale of 1-10? (1 being the least possible enjoyment and 10 being the most possible enjoyment)

_____

22. Are you right handed, left handed, or ambidextrous? _____

23. What are your hobbies or an activity in which you spend 5 or more hours a week (for example a sport or club or society you belong to)?

---

24. Assume you have £200 and had the chance to risk £5 to have a 50% to win £10, would you either...

a. Stay at £200

b. 50% chance of gaining £5 (to have a total of £205) and a 50% of losing £5 (To have a total of £195)

25. How fair did you find the rewards in the experiment?

a. Highly unfair

b. Unfair

c. Quite unfair

d. Quite fair

e. Fair

f. Very fair

26. Would you wish to change places with any other participant in the experiment, assuming you put in the same effort as they did for the pay they received?

A.0.6 Creativity Instructions

Judgement criterion for both tasks

In the excel file given task 1 is market as "0" in the task column and task 2 is market as "1". Each participant participated in both tasks but there is one case in session 7 where an individual only submitted ideas for the second of the two tasks.

Please go through one task at a time, it will make the process easier and clearer.

After each individual there is a table with the 4 criterions Flexibility, Originality, humour, and sarcasm. The scores can be inserted into the cells of the table when you are finished. How exactly each criterion will be scored will be explained next.

I will also ask you to rate your favourite ideas from the two tasks by giving them stars from 5 (the most) to 0 (if you feel the ideas do not warrant stars). Not all individuals need

to receive stars and there is no minimum or maximum amount of stars that need to be given. If you think the idea is very good, or one of your favourites put a 5, then 4 for ideas which are almost as good, etc. The scale from 5-1 stars is supposed to be a simple scale to show how much you like an idea. If the idea does not warrant a star simply leave a 0 or leave the cell blank. At least half of the cells should be blank, i.e. at most only half of the ideas get some stars. These should not be distributed individually, meaning that some individuals could have stars for every idea while others receive none. Simply put the amount of stars you think an idea should have into the cell which is highlighted in green. This is to speed up the scoring process and also to add some meaning to the stars. Remember this judging process is anonymous. No one will receive feedback from what scores they received.

In "sheet 2" in the excel file sent there is a table where you can fill in the scores for criterions Flexibility, Originality, humour, and sarcasm. You also received the printouts of the ideas separated by session and task, it might be easier to judge the 4 criterion using the paper but please fill in the excel table when you are finished scoring.

Flexibility

It will be scored by observing how many categories, from the ones listed, the ideas from each individual fall into. Note you have been given a file which has the creator identifier code, the task and the title and the description of the ideas. The fluency categories are different for the two tasks but there are 7 in total for both. If there is an idea which might not fit into any category perfectly see where it might fit in the best. The maximum the fluency score can be is 7 and the minimum is 0 but only if there were 0 entries. If there was one entry then the fluency score will also be one. The aim is to see how many different categories the individuals ideas fit into. If every idea the person entered fitted into the weapon category their flexibility score was 1. If the ideas fit into "weapon" and "decorative/beauty item" then the flexibility score would be 2. Thus the maximum different categories the ideas can fit into is 7 and the minimum 0 (only if 0 ideas are submitted).

Flexibility = How many categories are represented by the individuals ideas You are given 7 categories.

Divergent Task Flexibility Criterion

1. Weapon (Item which is used to hurt or gain control over another)
2. Decorative/beauty Item (including items such as Knick knacks, art objects)
3. Stationary or adhesive (stapler, paper weight)

4. Household item (shoe horn, camera holder, pin)
5. Medical item (stress relief, prosthetic limb, ear piercer)
6. Coping tool (printer, printing press, stamp)

Task 2 Flexibility Criterion

1. Non-animal Nature (includes maps, views of nature and descriptions of nature)
2. Life (includes humans, animals, insects etc.)
3. Food (reference to foods)
4. Feeling, Emotion or theory (humanising or representation of a situation feeling, or ideas of the object)
5. Aesthetic piece painting or design (includes art works, designs, or reference to clothes)
6. Household objects (includes references to things like yarn, rope, or pipe)
7. Formations or Markings (stains, markings, signatures)

Originality

Example definition of Originality = "The ability to think independently and creatively". Simply put down the number of original each participant had.

Humour

Example of a definition of humour = "The quality of being amusing or comic, especially as expressed in literature or speech". Simply put the number of ideas which were humorous or used humour as a devise to distinguish the idea etc. The minimum score is 0 and there is no set maximum, however the humour score cannot be more that the number of ideas the participant entered. If there are, for example, 5 ideas and none of them use humour then the score would be 0.

Sarcasm

Example of the definition of sarcasm = "The use of irony to mock or convey contempt". Insert the number of ideas which used sarcasm the description or title of the idea. The minimum score is 0 and there is no set maximum, however the sarcasm score cannot be more that the number of ideas the participant entered. If there are, for example, 5 ideas and none of them use humour then the score would be 0.

A.0.7 Experiment Intructions for Groups Without Tournament Pay (TP) and Public Information (PI)

FIGURE A.1: Experimental Structure(No TP or PI)

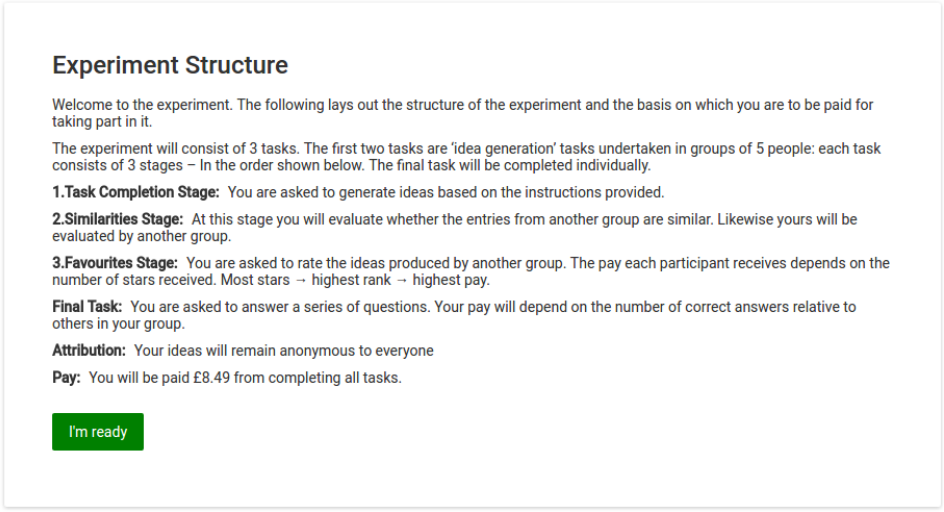


FIGURE A.2: Figural Task (No TP or PI)

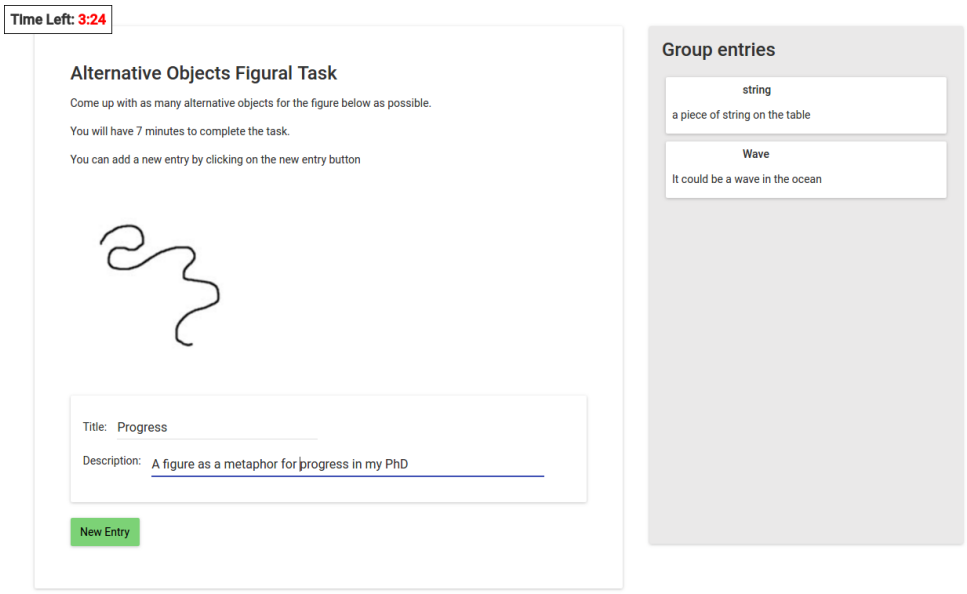


FIGURE A.3: Similarities Instructions (Same for Both Tasks and All Treatment Groups)

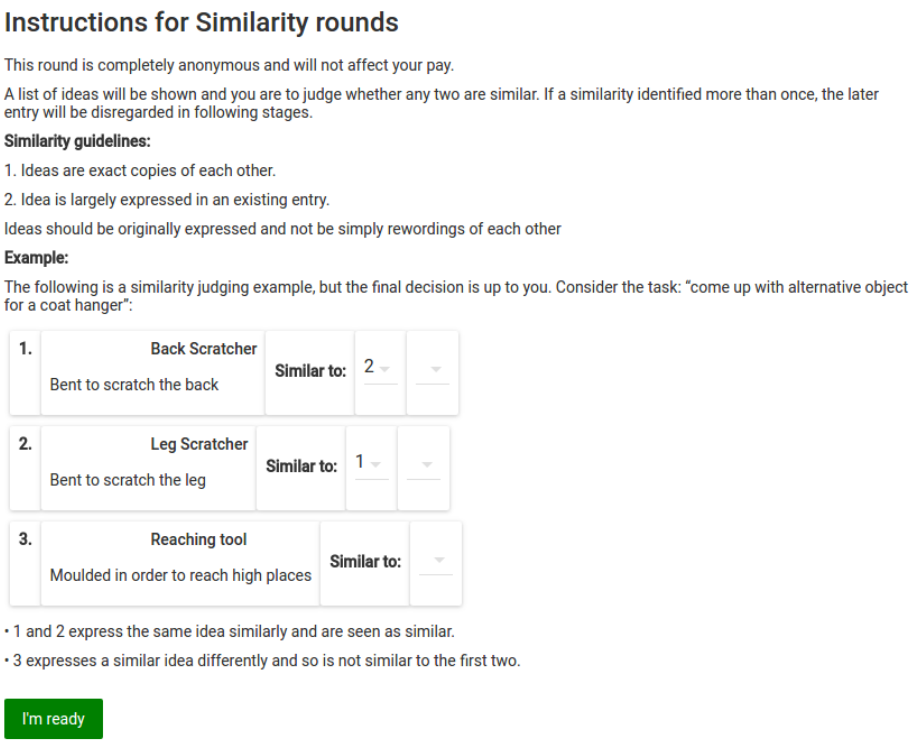


FIGURE A.4: Similarities Instructions (Same for Both Tasks and all Treatment Groups)

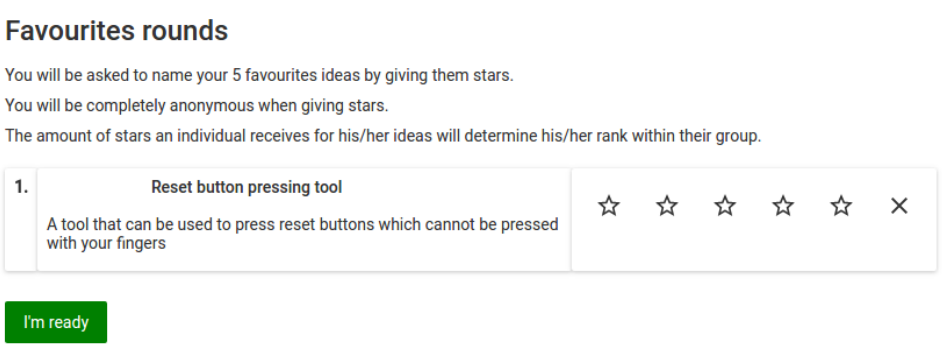
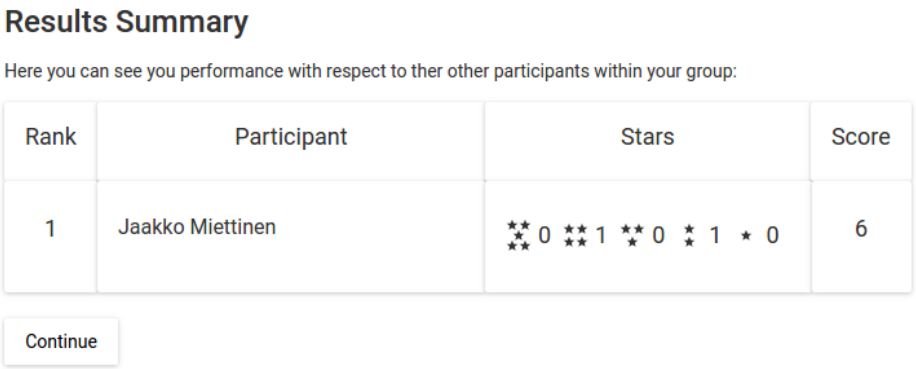
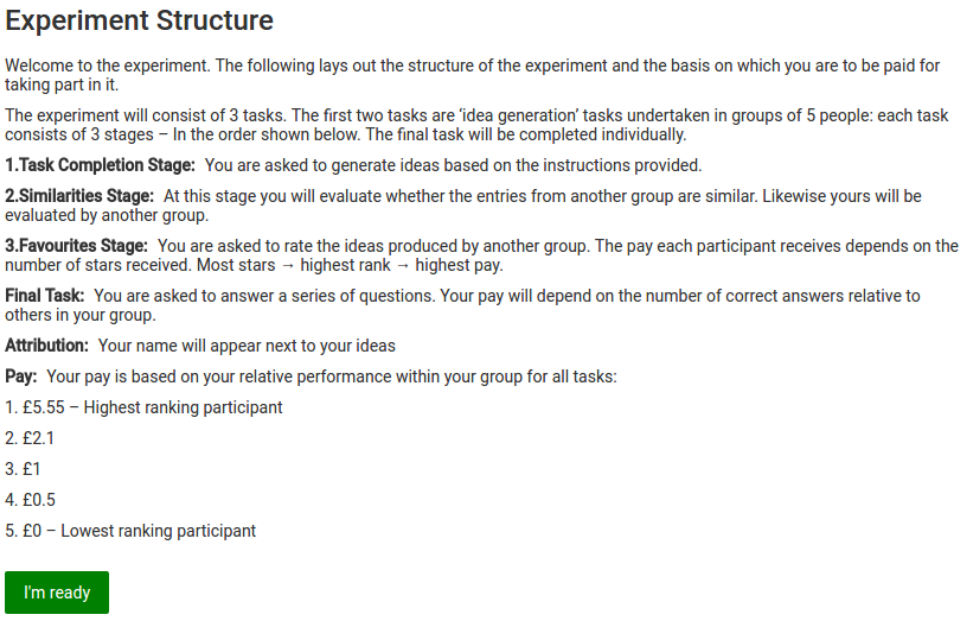


FIGURE A.5: Participant Results (No TP or PI)



Experimental Structure

FIGURE A.6: Experiment Instructions For Groups with Tournament Pay (TP) and Pubic Information (PI)



Instructions for PI&TP Group

FIGURE A.7: Divergent Task (TP and PI)

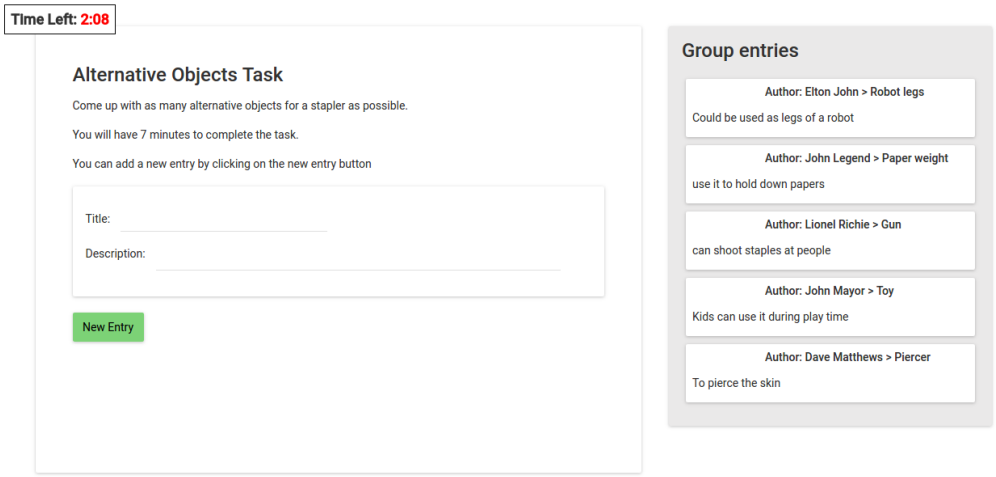
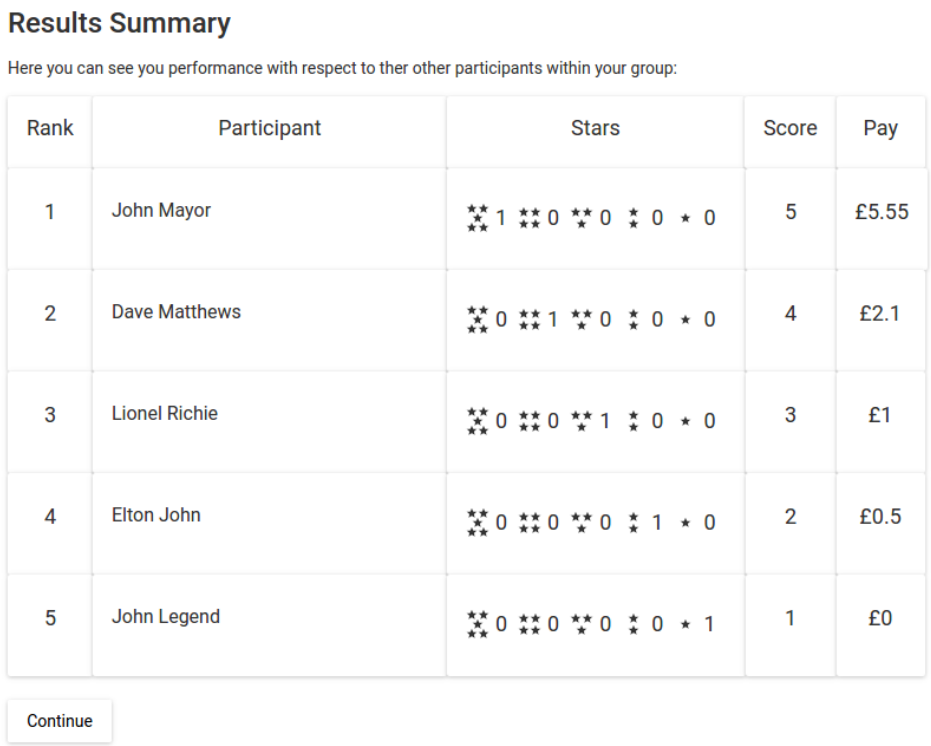


FIGURE A.8: Results (PI and TP)



A.0.8 Signals

The code for the program was written to take all the information about the favorites given. This means that every favourite given would be added together for each individual in a

group and then compared between individuals within the group and the participant with the most favourites would receive first place and so on. However there was a problem with the code and the full amount of information was not taken into account. The information about who was in each group was all correct which means individuals were compared to others in their group only. However from all the favorites given only a random sample was chosen and calculated by the program when calculating rank/results. The way the code picked up information was random but it caused some participants to receive incorrect signals of their rank i.e. being ranked 1st when they should have been 3rd and visa versa. No evidence was found of a difference in how people reacted to the signal between people who received the correct signal and people who received the incorrect signal. This means that a person who was ranked 1st reacted the same regardless of whether the person had the most favourites or if the person was ranked first due to the coding malfunction. This is evidence of the coding problem did not cause a distortion in the way individuals acted in the experiment and thus the results.

Below are some basic statistical analysis of how people reacted to the signal.
Let differentrank0 Be the group of people who received the correct signal.
Let differentrank1 BeBe the group of people who received the incorrect signal.

The Mann-Whitney Test will be used to see if distributions are statistically different from one-another.If the test is significant then the distributions are statistically different from one another.

Number of Ideas/output

The differences by treatment group are reviewed. I will start with the number of ideas created in the control group control group.

Control Group *Divergent Thinking Task*
Mean for the differentrank0 is 6.2.
Mean for the differentrank1 is 7.625.
Ratio = 0.813 Mann-Whitney Test:
z-value = -1.927
p-value = 0.0540

Figural Thinking Task
Mean for the differentrank0 is 8.93.
Mean for the differentrank1 is 9.79.
Ratio = 0.912

Mann-Whitney Test:
z-value = -1.200
p-value = 0.2303
There seems to be some difference between the difference in the distribution but it is not conclusive this difference is because of the difference in signals since the ratio of the difference is relatively close. We would need to observe other treatment groups.

PI Group *Divergent Thinking Task*
Mean for the differentrank0 is 6.551724.
Mean for the differentrank1 is 6.25.
Ratio = 1.048
Mann-Whitney Test:
z-value = -0.204
p-value = 0.8380

Figural Thinking Task Mean for the differentrank0 is 9.896552.
Mean for the differentrank1 is 9.05.
Ratio = 1.093
Mann-Whitney Test:
z-value = 0.329
p-value = 0.7422
No evidence that there is a change in behaviour after the differences in signals in the attribution group (AR).

TP Group *Divergent Thinking Task*
Mean for the differentrank0 is 6.133333.
Mean for the differentrank1 is 5.95 .
Ratio = 1.03
Mann-Whitney Test:
z-value = -0.204
p-value = 0.8380

Figural Thinking Task
Mean for the differentrank0 is 9.733333.
Mean for the differentrank1 is 10.75.
Ratio = 0.095
Mann-Whitney Test:

z-value = 0.339
p-value = 0.7349
No evidence that there is a change in behaviour after the differences in signals in the attribution group (ER). The ratio does go from positive to negative however the ratio is close to 1 both times.

TP and PI Group *Divergent Thinking Task*
Mean for the differentrank0 is 5.52.
Mean for the differentrank1 is 7.5 .
Ratio = 0.736
Mann-Whitney Test:
z-value = -1.749
p-value = 0.0802

Figural Thinking Task
Mean for the differentrank0 is 9.24.
Mean for the differentrank1 is 12.55.
Ratio = 0.736
Mann-Whitney Test:
z-value = -2.297
p-value = 0.0216
No evidence of differences in behaviour between signal groups.Incorrect signal groups had more ideas in both tasks (ration is 0.736 in both). Even though the distributions for the number of ideas between the two signal groups the ration of ideas between tasks is the same between signal groups in both tasks is similar and so no evidence of differences in how signals affected performance

Creativity Score Per Idea

Control Group *Divergent Thinking Task*
Mean for the differentrank0 is 1.33.
Mean for the differentrank1 is 1.19.
Ratio = (1.33/1.19=1.11)
Mann-Whitney Test:
z-value = 1.613
p-value = 0.1068

Figural Thinking Task

Mean for the differentrank0 is 1.49.
Mean for the differentrank1 is 1.33.
Ratio = (1.49/1.33=1.12)
Mann-Whitney Test:
z-value = 2.038
p-value = 0.0415
No evidence of different direction effects, Both distributions are different at 10%m and 5% before and after the signal. The ratio before and after is almost identical (1.33/1.19=1.11),(1.49/1.33

PI Group *Divergent Thinking Task*
Mean for the differentrank0 is 1.29.
Mean for the differentrank1 is 1.19 .
Ratio = (1.29/1.19=1.59)
Mann-Whitney Test:
z-value = 0.998
p-value = 0.3183

Figural Thinking Task
Mean for the differentrank0 is 1.46.
Mean for the differentrank1 is 1.45.
Ratio = (1.46/1.45=1.01)
Mann-Whitney Test:
z-value = 0.397
p-value = 0.6915
No evidence of different direction effects, according to the Mann-Whitney test both distributions are statistically different. (1.29/1.19=1.59),(1.46/1.45=1.01) there is a difference in the ratios before and after the signal however according to the Mann Whitney Test both distributions before and after are still statistically not different from each other.

TP Group *Divergent Thinking Task*
Mean for the differentrank0 is 1.389372.
Mean for the differentrank1 is 1.303177 .
Ratio = 1.07
Mann-Whitney Test:
z-value = -0.545
p-value = 0.5855

Figural Thinking Task
Mean for the differentrank0 is 1.52899.
Mean for the differentrank1 is 1.354894.
Ratio = 1.13
Mann-Whitney Test:
z-value = 0.723
p-value = 0.4696
Different of effect from divergent to the figural task. However they are not Statistically different from each other in either task. The ratios before and after are also similar in both tasks.

TP and PI Group *Divergent Thinking Task*
Mean for the differentrank0 is 1.30.
Mean for the differentrank1 is 1.28.
Ratio = (1.30/1.28=1.01)
Mann-Whitney Test:
z-value = 0.686
p-value = 0.4927

Figural Thinking Task
Mean for the differentrank0 is 1.47.
Mean for the differentrank1 is 1.24.
Ratio = (1.47/1.24=1.185)
Mann-Whitney Test:
z-value = 2.514
p-value = 0.0119
Some evidence of different direction effects. Statistically different distributions in figural task but not divergent task but the group with different signals had consistently lower scores before and after the signal (1.30/1.28=1.01)(1.47/1.24=1.185). However the number of ideas were also significantly different between groups. This could explain the significant different creativity scores per idea.

Appendix B

Chapter 4 Appendix

B.1 Dependent Variable Descriptive Statistics

The variables in this section with a * next to them indicate a variable for the control math task.

TABLE B.1: All Participants

Variable	Obs	Mean	Std. Dev.	Min	Max
DT Ideas	197	6.431472	3.318413	0	20
FT Ideas	197	9.903553	3.76962	2	28
DT Creativity	197	14.3198	6.378317	0	33.5
FT Creativity	197	23.02538	6.92171	6	44.5
Per Idea DT Creativity	197	1.334865	0.451192	0	3.5
Per Idea FT Creativity	197	1.402222	0.313172	0.142857	2.625
DT Total Score	197	14.27411	8.880499	0	44
FT Total Score	197	23.15736	10.63018	3	61
Per Idea DT Total Score	197	2.30151	1.307439	0	8
Per Idea FT Total Score	197	2.409294	0.908694	0.384615	5.5
Total Problems Solved*	197	22.80203	5.930412	9	30
Correct Answers*	197	20.07107	6.424207	7	30
Total Solved 29*	147	20.35374	4.841038	9	29
Total Correct 29*	147	17.68707	5.336361	7	28

TABLE B.2: Control

Variable	Obs	Mean	Std. Dev.	Min	Max
DT Ideas	53	6.811321	3.08256	1	16
FT Ideas	53	9.320755	3.22713	3	19
DT Creativity	53	14.88679	5.579531	2	28.5
FT Creativity	53	21.91509	6.197655	7.5	36.5
Per Idea DT Creativity	53	1.280596	0.40334	0.25	2.125
Per Idea FT Creativity	53	1.421653	0.308162	0.921053	2.625
DT Total Score	53	15.18868	9.104218	0	34
FT Total Score	53	21.30189	10.10443	5	49
Per Idea DT Total Score	53	2.372198	1.296369	0	5.666667
Per Idea FT Total Score	53	2.360913	0.996484	0.625	5.444444
Total Problems Solved*	53	22.81132	6.18328	9	30
Correct Answers*	53	20.15094	6.614077	8	30
Total Solved 29*	39	20.23077	5.142504	9	29
Total Correct 29*	39	17.23077	5.09624	8	25

TABLE B.3: Public Information

Variable	Obs	Mean	Std. Dev.	Min	Max
DT Ideas	49	6.428571	3.696846	1	20
FT Ideas	49	9.55102	3.797265	2	22
DT Creativity	49	13.71429	6.673954	3	33.5
FT Creativity	49	22.73469	7.525721	6	42.5
Per Idea DT Creativity	49	1.252442	0.386167	0.461539	2
Per Idea FT Creativity	49	1.456543	0.310939	0.909091	2.125
DT Total Score	49	12.69388	8.289562	0	44
FT Total Score	49	22.42857	12.5582	6	61
Per Idea DT Total Score	49	2.205427	1.458759	0	8
Per Idea FT Total Score	49	2.385581	0.981197	0.777778	5.5
Total Problems Solved*	49	23.12245	5.596251	11	30
Correct Answers*	49	20.4898	5.895346	8	30
Total Solved 29*	39	21.35897	4.890846	11	29
Total Correct 29*	39	18.97436	5.503526	8	28

TABLE B.4: Tournamet Pay Only

Variable	Obs	Mean	Std. Dev.	Min	Max
DT Ideas	50	6.06	3.09977	1	15
FT Ideas	50	10.14	3.854549	4	28
DT Creativity	50	14.36	6.178501	3.5	28
FT Creativity	50	22.92	5.413852	10.5	34
Per Idea DT Creativity	50	1.52899	0.540867	0.8	3.5
Per Idea FT Creativity	50	1.354894	0.32283	0.142857	2
DT Total Score	50	16.2	9.833305	0	41
FT Total Score	50	23.64	9.451833	5	45
Per Idea DT Total Score	50	2.578735	1.355758	0	5.75
Per Idea FT Total Score	50	2.389099	0.699142	0.384615	3.714286
Total Problems Solved*	50	21.96	6.353402	10	30
Correct Answers*	50	19.26	6.416846	8	30
Total Solved 29*	36	18.83333	4.538722	10	28
Total Correct 29*	36	16.77778	4.829144	8	27

TABLE B.5: Public Information and Tournament Pay

Variable	Obs	Mean	Std. Dev.	Min	Max
DT Ideas	50	6.06	3.09977	1	15
FT Ideas	50	10.14	3.854549	4	28
DT Creativity	50	14.36	6.178501	3.5	28
FT Creativity	50	22.92	5.413852	10.5	34
Per Idea DT Creativity	50	1.52899	0.540867	0.8	3.5
Per Idea FT Creativity	50	1.354894	0.32283	0.142857	2
DT Total Score	50	16.2	9.833305	0	41
FT Total Score	50	23.64	9.451833	5	45
Per Idea DT Total Score	50	2.578735	1.355758	0	5.75
Per Idea FT Total Score	50	2.389099	0.699142	0.384615	3.714286
Total Problems Solved*	50	21.96	6.353402	10	30
Correct Answers*	50	19.26	6.416846	8	30
Total Solved 29*	36	18.83333	4.538722	10	28
Total Correct 29*	36	16.77778	4.829144	8	27

B.2 Control Variable Descriptive Statistics

Everything in this section with a * is to signify the variable is only relevant for chapter 5.

TABLE B.6: Control

Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	53	0.226415	0.422516	0	1
Math Efficacy*	53	41.35849	25.08684	0	86
Creative Efficacy	53	70.66667	14.98746	36.66667	96.66667
Creative Family	53	0.415094	0.497454	0	1
English Speaking	53	0.566038	0.500363	0	1
Risk Aversion	53	2.716981	1.432821	1	4
Ambiguous Risk	53	38.39623	29.10085	0	100
Righthanded	53	0.679245	0.471233	0	1
Famous	53	0.660377	0.478113	0	1
More in Creative Fields	53	0.792453	0.409432	0	1
Arts Hobby	53	0.660377	0.478113	0	1
GSA	53	0.45283	0.502534	0	1
Age	53	22.20755	4.157285	18	38

TABLE B.7: Public Information Only

Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	49	0.204082	0.407206	0	1
Math Efficacy	49	42.77551	24.22745	4	88
Creative Efficacy	49	71.2585	15.68472	30	100
Creative Family	49	0.44898	0.502545	0	1
English Speaking	49	0.571429	0.5	0	1
Risk Aversion	49	2.387755	1.455111	1	4
Ambiguous Risk	49	34.65306	25.27643	0	100
Righthanded	49	0.795918	0.407206	0	1
Famous	49	0.571429	0.5	0	1
More in Creative Fields	49	0.714286	0.456436	0	1
Arts Hobby	49	**0.693878**	0.465657	0	1
GSA	49	0.469388	0.504234	0	1
Age	49	20.71429	2.041241	18	25

TABLE B.8: Tournament Pay Only

Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	50	0.34	0.478518	0	1
Math Efficacy*	50	37.78	23.23903	0	84
Creative Efficacy	50	73.34667	13.12956	38.33333	100
Creative Family	50	0.34	0.478518	0	1
English Speaking	50	0.48	0.504672	0	1
Risk Aversion	50	2.92	1.426284	1	4
Ambiguous Risk	50	26.3	27.01266	0	100
Righthanded	50	0.76	0.431419	0	1
Famous	50	0.48	0.504672	0	1
More in Creative Fields	50	0.82	0.388088	0	1
Arts Hobby	50	0.5	0.505076	0	1
GSA	50	0.48	0.504672	0	1
Age	50	22.32	5.377352	18	45

TABLE B.9: Public Information and Tournament Pay

Variable	Obs.	Mean	Std. Dev.	Min	Max
Male	45	0.355556	0.48409	0	1
Math Efficacy*	45	40.51111	24.94049	0	92
Creative Efficacy	45	70.62963	11.10833	48.33333	100
Creative Family	45	0.311111	0.468179	0	1
English Speaking	45	0.488889	0.505525	0	1
Risk Aversion	45	2.888889	1.368845	1	4
Ambiguous Risk	45	35.77778	28.26489	0	100
Righthanded	45	0.777778	0.420438	0	1
Famous	45	0.577778	0.499495	0	1
More in Creative Fields	45	0.8	0.40452	0	1
Arts Hobby	45	0.644444	0.48409	0	1
GSA	45	0.422222	0.499495	0	1
Age	45	21.02222	2.606712	18	32

B.3 Rater Reliability

TABLE B.10: Inter Rater Correlation

	Correlation	
	First Rater DT	First Rater FT
Second Rater DT	0.8104	
Second Rater FT		0.8321

TABLE B.11: Inter Rater Reliability

	Cronbachs Alpha	
	First Rater DT	First Rater FT
Second Rater DT	0.8871	
Second Rater FT		0.8934

Appendix C

Chapter 5 Appendix

TABLE C.1: The Percentage of Individuals Who Stated Being More Creative Than 80% and 50% of Others

Variable	Obs	Mean	Std. Dev.	Min	Max
morecreat 80	197	.3451777	.4766375	0	1
morecreat 50	197	.680203	.467586	0	1

C.1 Descriptive statistics

TABLE C.2: All observations

Variable	Obs.	Mean	Std. Dev.	Min	Max
Performance Satisfaction	197	3.994924	1.145076	1	6
Reward Fairness	194	4.273196	1.029414	1	6
Tournament Pay	197	0.4822335	0.500957	0	1
Envy	197	0.2639594	0.441901	0	1
All Production	197	39.13706	9.514034	21	72
Win Score	223	0.5381166	0.751653	0	3
Total Rank	197	8.944162	2.746413	3	15
Fun	197	6.365482	2.596785	0	10
Combined Quality	197	7.44789	2.042497	3.083333	15
Male	197	0.2791878	0.449743	0	1
Math Efficacy	197	40.60914	24.26395	0	92
Creative Efficacy	197	71.48562	13.85225	30	100
Creative Family	197	0.3807107	0.486799	0	1
English Speaking	197	0.5279188	0.500492	0	1
Risk Aversion	197	2.725888	1.427139	1	4
Ambiguous Risk	197	33.79695	27.64146	0	100
Righthanded	197	0.751269	0.433379	0	1
Famous	197	0.5736041	0.495813	0	1
More in Creative Fields	197	0.7817259	0.414127	0	1
Arts Hobby	197	0.6243655	0.48552	0	1
GSA	197	0.4568528	0.499404	0	1
Age	197	21.59391	3.855497	18	45

TABLE C.3: Control

Variable	Obs.	Mean	Std. Dev.	Min	Max
Performance Satisfaction	53	4.377358	0.8820085	3	6
Reward Fairness	50	4.48	0.9089128	2	6
Tournament Pay	53	0	0	0	0
Envy	53	0.188679	0.3949977	0	1
All Production	53	38.9434	9.130286	22	53
Win Score	53	0.603774	0.8166447	0	3
Total Rank	53	8.90566	2.956506	3	14
Fun	53	6.660377	2.385399	0	10
Combined Quality	53	7.43536	2.208596	3.194445	14.19444
Male	53	0.226415	0.4225158	0	1
Math Efficacy	53	41.35849	25.08684	0	86
Creative Efficacy	53	70.66667	14.98746	36.66667	96.66667
Creative Family	53	0.415094	0.4974536	0	1
English Speaking	53	0.566038	0.5003627	0	1
Risk Aversion	53	2.716981	1.432821	1	4
Ambiguous Risk	53	38.39623	29.10085	0	100
Righthanded	53	0.679245	0.4712334	0	1
Famous	53	0.660377	0.4781131	0	1
More in Creative Fields	53	0.792453	0.4094316	0	1
Arts Hobby	53	0.660377	0.4781131	0	1
GSA	53	0.45283	0.5025335	0	1
Age	53	22.20755	4.157285	18	38

TABLE C.4: Public Information

Variable	Obs.	Mean	Std. Dev.	Min	Max
Performance Satisfaction	49	4.183673	0.9502953	2	6
Reward Fairness	49	4.489796	0.7394381	3	6
Tournament Pay	49	0	0	0	0
Envy	49	0.326531	0.4738035	0	1
All Production	49	39.10204	9.988003	21	72
Win Score	49	0.612245	0.7307623	0	2
Total Rank	49	8.877551	2.728191	4	15
Fun	49	6.632653	2.369018	0	10
Combined Quality	49	7.299992	2.313708	3.083333	15
Male	49	0.204082	0.4072055	0	1
Math Efficacy	49	42.77551	24.22745	4	88
Creative Efficacy	49	71.2585	15.68472	30	100
Creative Family	49	0.44898	0.5025445	0	1
English Speaking	49	0.571429	0.5	0	1
Risk Aversion	49	2.387755	1.455111	1	4
Ambiguous Risk	49	34.65306	25.27643	0	100
Righthanded	49	0.795918	0.4072055	0	1
Famous	49	0.571429	0.5	0	1
More in Creative Fields	49	0.714286	0.4564355	0	1
Arts Hobby	49	**0.693878**	0.4656573	0	1
GSA	49	0.469388	0.5042338	0	1
Age	49	20.71429	2.041241	18	25

TABLE C.5: Tournament Pay

Variable	Obs.	Mean	Std. Dev.	Min	Max
Performance Satisfaction	50	3.62	1.227076	1	6
Reward Fairness	50	4.08	1.275195	1	6
Tournament Pay	50	1	0	1	1
Envy	50	0.3	0.46291	0	1
All Production	50	38.16	9.782033	22	71
Win Score	50	0.6	0.7559289	0	2
Total Rank	50	9	2.579353	4	14
Fun	50	5.5	2.78663	0	10
Combined Quality	50	7.851718	1.741713	4.061905	11.1875
Male	50	0.34	0.4785181	0	1
Math Efficacy	50	37.78	23.23903	0	84
Creative Efficacy	50	73.34667	13.12956	38.33333	100
Creative Family	50	0.34	0.4785181	0	1
English Speaking	50	0.48	0.504672	0	1
Risk Aversion	50	2.92	1.426284	1	4
Ambiguous Risk	50	26.3	27.01266	0	100
Righthanded	50	0.76	0.4314191	0	1
Famous	50	0.48	0.504672	0	1
More in Creative Fields	50	0.82	0.3880879	0	1
Arts Hobby	50	0.5	0.5050763	0	1
GSA	50	0.48	0.504672	0	1
Age	50	22.32	5.377352	18	45

TABLE C.6: Public Information and Tournament Pay

Variable	Obs.	Mean	Std. Dev.	Min	Max
Performance Satisfaction	45	3.755556	1.351019	1	6
Reward Fairness	45	4.022222	1.05505	1	5
Tournament Pay	45	1	0	1	1
Envy	45	0.244444	0.4346135	0	1
All Production	45	40.48889	9.289834	22	60
Win Score	45	0.6	0.8090398	0	3
Total Rank	45	9	2.779797	3	14
Fun	45	6.688889	2.72048	0	10
Combined Quality	45	7.174993	1.820564	4.125	11.5625
Male	45	0.355556	0.4840903	0	1
Math Efficacy	45	40.51111	24.94049	0	92
Creative Efficacy	45	70.62963	11.10833	48.33333	100
Creative Family	45	0.311111	0.4681794	0	1
English Speaking	45	0.488889	0.505525	0	1
Risk Aversion	45	2.888889	1.368845	1	4
Ambiguous Risk	45	35.77778	28.26489	0	100
Righthanded	45	0.777778	0.4204375	0	1
Famous	45	0.577778	0.4994947	0	1
More in Creative Fields	45	0.8	0.4045199	0	1
Arts Hobby	45	0.644444	0.4840903	0	1
GSA	45	0.422222	0.4994947	0	1
Age	45	21.02222	2.606712	18	32

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