Time spent on New Songs: Word of Mouth and Price Effects on Teenager Consumption

Noémi Berlin[*], Anna Bernard[†], Guillaume Fürst [‡]

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Abstract

The stardom system characterizes creative industries : the demand and revenues are concentrated on a few bestselling books, movies or music. In this paper, we study the demand structure between bestsellers and niches in the music industry. We set up an experiment where participants face real choices situations. We create three conditions to isolate the effect of information and incentives on diversity. In a first condition, music is consumed for free. In a second one, subjects receive a prior information on others' evaluation on songs to study the effect of Word-of-Mouth. Finally, in a third one, a real market is settled and music are bought. Significant evidence shows that the Word-of-Mouth lower diversity, while price incentives tend to lift it. In both treatments, subjects also specialize their consumption as they concentrate more on either bestsellers or niches.

Keywords: Experimental economics, Cultural Goods, Music industry, Stardom System.

JEL classification: D03, C9

[*]Paris School of Economics, Université Paris 1 Panthéon-Sorbonne, Centre d'Economie de la Sorbonne 106-112 Bd de l'Hôpital - 75013 Paris, Noemi.Berlin@univ-paris1.fr

[†]Paris School of Economics, Université Paris 1 Panthéon Sorbonne, Centre d'Economie de la Sorbonne 106-112 Bd de l'Hôpital - 75013 Paris, Anna.Bernard@univ-paris1.fr

[‡]Université Paris Descartes 71, Avenue Edouard Vaillant - 92100 Boulogne Billancourt, guillaume.fuerst@unige.ch

1 Introduction

The structure of creative industry is generally described as being shaped according to the 80/20 Pareto law: 80% of the total revenue is made by 20% of the supply. This stardom economy can be analyzed through differentiation in terms of talents (Rosen, 1981) or in terms of informational gains (Adler, 1985). As cultural goods are experienced goods (Nelson 1970), they are characterized by an exacerbated uncertainty. Mimicry can lead to lower search costs and this is why the demand concentrates on a restrained number of productions. It can also be that consumers benefit from network effects when imitating others' consumption: besides the direct utility derived from consumption, one can see his/her satisfaction by sharing this experience with peers. There is a natural incentive to consume what others consume. According to Adler (1985), the most popular artist is always preferred and even an artist who is talented as the star or who offers a lower price cannot entice the demand. In a controlled laboratory experiment, Salganik, Dodds and Watts (2006) find that observing other individuals' behavior actually increases the skewness of the demand distribution.

In the supply side, because "nobody knows" (Caves, 2000) which production will lead the stardom system, firms bet on a small sample of artists and invest on large promotion campaign to enhance what is called informational cascades"(Bikhchandani, Hirshleifer and Welch, 1992, Banerjee, 1992). With the digitalization of the industry, Anderson (2004) predicted that the "long tail" would smooth the sells distribution by lowering search costs. But little is known about what happen when consumers are faced with choices between bestsellers and niches without any search cost.

Indeed, consumers are also looking for novelty because cultural goods are semi-durable goods (Bianchi, 2002). The arousal and satisfaction derived from its consumption varies over time and exposure: the taste for a specific musical song often increases with exposure and then decreases through over-exposure (Hunter and Schellenberg, 2011) [1]. But, because it

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[1]Hunter and Schellenberg find that Openness-to-Experience is correlated with the shape of the function of exposure (linking number of exposures and liking ratings): while low openness leads to an inverted U-shape function, high openness is linked with a decreasing liking rating function according to the number of exposures

can be costly or risky to try new artists, novelty-seeking behavior might not be enough to counterbalance the stardom structure of the market.

In terms of public policies, it is crucial to promote creative innovation. A deterioration of cultural diversity may lead to a decrease in the demand (Benhamou, 2002). In France, radios have the obligation of broadcasting 40% of its songs in French, half of which has to be new in order to compensate the stardom structure of the music industry.

In this paper, we study the effect of information and incentives on the consumption distribution (concentration versus diversity) between bestsellers and new artists. It remains difficult to analyze the ins and outs of novelty consumption since data are difficult to gather. If we can have data on consumption, we cannot know what drives consumers' choices. We then use the experimental methods in order to isolate the effect of their peers' information (word-of-mouth) and price incentives on the concentration or diversity of consumption. We propose an experiment that simulates an environment where subject face real repeated choices between different types of musical songs (bestsellers songs and new artists productions). We choose to study musical consumption as it is a private consumption, easy to reproduce in an experimental laboratory. We run this experiment on teenagers as they like music (North, Hargreaves and O'Neill, 2000), are prone to the stardom system and they are influenced by peers opinion (Berns et al., 2010). We create three conditions, the first being a free choice condition, a second where subjects receive information about others evaluation and a third where a real market is established including prices. Our experimental design has two main advantages: we can precisely measure demand for the two categories and, by comparing treatments, we can isolate the effect of information and incentives on the demand structure.

We find that there are a macro and a micro effects of the two treatments on diversity. On the global consumption, we find that the Word-of-Mouth has a negative impact on diversity confirming Adler's theory. Conversely, the Market treatment has a positive impact on diversity since half of the demand is dedicated to both categories. On an individual effect, both information and incentives lead to more concentrated consumption. We calculate an

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individual Herfindahl Index and estimate it, showing that the two treatment raise the value of this Index.

Section 2 describes the experimental design. Section 3 presents the effect of the two treatments on the macro diversity and shows that while Word-of-Mouth has a negative impact on novelty consumption, market rises it. In Section 4, we show that, on an individual level, word-of-mouth and price reduce diversity in consumption. Section 5 discusses and concludes.

2 Experimental design

2.1 Niches versus bestsellers

To implement niches and stars, participants face two track categories. On one hand, the Top 30 category, the bestsellers category, gathers the 30 French top sells of the first week of November 2012. One can expect that the teenagers, regarding their age, are mostly exposed to this category and know about it. On the other hand, the niches category is composed by the most popular songs of the French website *Noomiz*. *Noomiz* is a website that enables new artists, who did not signed a contract with a music label yet [2], to offer their production, such that one can assume these tracks have never - or at least rarely - been experienced by the participants. This category is supposed to be a niche category since it is only composed by unknown artist. We call this category the Novelty category.

The two categories are composed by 30 songs each and are characterized by the same language and genre's distribution[3]. At each period, participants faced two songs, one of each category.[4] Both songs belong to the same genre such that we can implement differences in popularity: the Top 30 category represents songs for which teenagers are exposed while the Novelty category is composed by songs that the participants could like (they are of the same

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[2]A popularity ranking allow them to encounter professionals of the music industry.

[3]Each category is composed by 24 Anglo-Saxon tracks and 6 french ones. In terms of genres, there are 13 electro/dance/remix's songs, 10 pop/rock/folk and 7 Rap/RnB/Hip-hop/Soul. Songs are classified by genre by both the SNEP (Syndicat National de l'édition Phonographique, French union of the phonographic edition) and Noomiz.

[4]All participant are facing the same set of songs in the same order.

genre and probably the same quality, but they are unknown)[5]

2.2 Procedure

The experiment consists in 30 listening periods of 90 seconds. Participants are first asked to choose between two songs, one from each foregoing category, knowing that for each period, the two songs belong to the same musical genre. The countdown starts and they listen to the chosen song. During the 90 seconds, participants are allowed to switch only once to the other song - that was not initially chosen:

- If a subject decides to switch, she is asked to evaluate the song that they just listened to on a five-points-scale illustrated by smileys. Then, at the end of the period, he/she is asked to evaluate the second song that they listened to (see figure 1).

- If a subject decides not to switch, she is only asked to evaluate the only song she listened to at the end of the 90 seconds period.
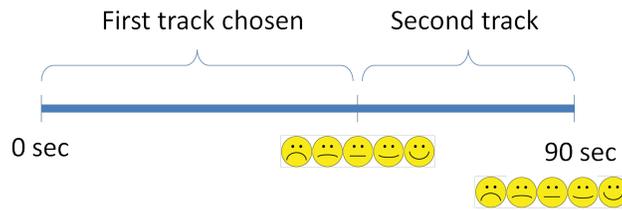

Figure 1 – Period summary

The Benchmark Treatment (B) Subjects ($n = 33$) are facing the basic procedure described above.

The Word-of-Mouth Treatment (WoM) In the Word-of-mouth treatment ($n = 41$), subjects know every song mean evaluation of the benchmark treatment. It appears as a

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[5]Throughout the experiment, the Top 30 is better evaluated than the Novelty category. This corroborates the idea that people prefer what they already experienced or have frequently experienced.

five-stars-scale (with mid-stars). This is to simulate Word-of-Mouth information that can theoretically lead to an informational cascade. If one song has no evaluation - simply because no one, in the benchmark market, listened to it - participants are told so.

The Market Treatment (M) In the Market treatment ($n = 36$), two participants are randomly chosen to play the role of sellers, while the others are buyers.

The supply side

Two subjects are randomly designed to sell one category of music to the others in order to implement a monopolistic competition : one seller is to offer songs from the Top 30 category while the other is to offer songs from the New Artists category all along the experiment. At the beginning of the experiment, this situation is described to them.

When the experiment starts, each seller is assigned to one of the two genre and will only sell this specific genre during the whole session (Top 30 or New Artists). At each period, the sellers listen to one song of the genre they will have to sell and set a per second price included in a defined range[6].

There overall profit is calculated by:

$$\Pi = \sum_{t=1}^{30} p^{t,j} \tau_{t,j}$$

where j is the song's category and τ is the sum of seconds that buyers listened to category j at time t.

The seller who makes the highest profit wins the candies' bag.

Figure (2) represents the two Market sessions and the prices that are set by the two sellers. Not surprisingly, we can see that for both session the Top 30 price is almost always higher than the Novelty price such that there are incentives to consume the Novelty category. We can also see that there is a convergence in price throughout rounds.

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[6]In the Market Treatment, prices are set to be in an experimental money - the ECU - convertible in candies. Sellers have to set a price from 0 to 20 units of ECU.
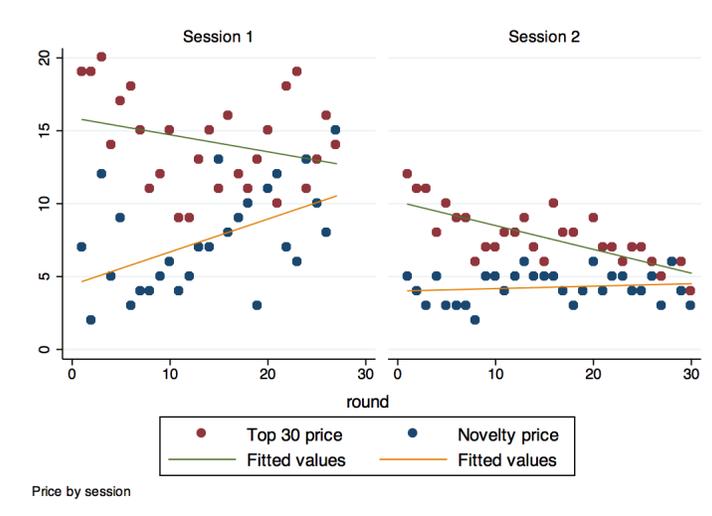
Figure 2 – Price

The demand side

Besides the two selected sellers, all the other participants from each session are music buyers. At each period, they are offered one song of each category at a differentiated price p^j. They also have a per period budget of 1800 ECU that diminishes according to the song - and the associated price - they are listening to. At the end of the 90 seconds, what is left from the individual i's budget is to be saved, such that his/her overall saving is:

$$S_i = \sum_{t=1}^{30} 1800 - p^{t,j} * \tau_{t,j,i}$$

At the end of the experiment, S_i is converted into candies in weight[7].

2.3 Sample comparison

110 high school students were recruited from three distinct French academies (Paris, Versailles and Créteil) and participated to the experiment, which was conducted in the Parisian Experimental Economics Laboratory (LEEP). Each of the participants faced with an individual screen and headphones. At the end of the experiment, they were asked to fill in a

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[7]The conversion rate is 2gr. for 1000ECU.

questionnaire. Table 1 presents the descriptive statistics of our sample.

Variables	Benchmark $n = 33$	Word-of-mouth $n = 41$	Market $n = 36$	p-value[8] two-sample t-test
Mean age	15.06 (0.6)	15.22 (0.52)	15.1 (0.46)	ns
Gender (% female)	51.51	51.21	50	ns
Music exposure				
Exposure to mainstream music media	1.61	1.64	2.05	$p_{BvsM} = 0.07$ $p_{WoMvsM} = 0.07$
Music listening habits				
(0: rarely, 4: very often)				
Hip-hop/Rap	3.13(1.00)	2.49(1.42)	2.97(1.27)	$p_{BvsWoM} = 0.04$
RnB	3.06(0.98)	2.68(1.39)	3(1.07)	ns
Zouk, Dancehall, Raggeaton	1.94(1.43)	1.67(1.30)	2.06(1.43)	ns
Pop	2.70(1.07)	2.51(1.12)	2.38(1.30)	ns
Rock	1.81(1.33)	1.97(1.41)	1.65(1.50)	ns
Heavy Metal	0.81(1.31)	0.90(1.22)	0.47(0.83)	$p_{WoMvsM} = 0.08$
Jazz/Blues	0.76(1.03)	0.93(0.96)	1.24(1.16)	$p_{BvsM} = 0.08$
Classical	0.45(0.71)	0.98(1.08)	0.71(0.94)	$p_{BvsWoM} = 0.03$
Practice and attitude toward Novelty[9]				
Practice	4.1	4.4	5.7	$p_{MvsWoM} = 0.05$
Novelty seeking	6.2	5.4	5.7	$p_{BvsWoM} = 0.03$ $p_{BvsM} = 0.04$
Openness	18.8	15.1	18.7	$p_{BvsWoM} = 0.003$ $p_{WoMvsM} = 0.009$
Attitude toward risk and time				
Risk aversion[10] (%)	69.9	83	76.47	ns
Impatience[11](%)	18.2	17.1	23.5	ns

Note: Std. Dev. in brackets

Table 1 – Sample comparison

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[8]ns means that all the two-sample t-tests are non significant. Only significant p-values are reported.
[9]To control for musical practice, we ask two questions:

- Music is an activity that you practice (have practiced) in your spare time, for pleasure?

- For you, music is an important activity that you practice (have practiced) pretty seriously? The subjects answer thanks to a 5-points Likert scale (from strongly disagree to strongly agree) and the practice variable is the sum of both answers.

To control for Novelty-seeking behavior, we ask the subject to which extend he/she agree with the following sentences (on a 5-points Likert scale):

- You like discovering new artists

3 Effect on Average Diversity

3.1 Descriptive data

First, we study the impact of information and incentives on the overall consumption distribution. In Figure 3, we can see that the average consumption overall, the subject always listen more to the Top 30 category with is consistent which the average self evaluation of both categories. The graph also informs us about the effect of word-of-mouth and market on the consumption diversity.

First, the word-of-mouth treatment has a negative impact on the demand for novelty: while subjects listen to 36 seconds of the Novelty category on average in the Benchmark treatment, they only listen to 30 seconds of it in the WoM treatment (a two-sided ttest yields p<0.001). This corroborates Adler's theory since information reinforces the market

- You like looking for novelty

The Novelty-seeking variable is the sum of both answer. To control for Openness, we ask the subject select the answer that best fits how each of the following statements applies to him/her (on a 5-points Likert scale):

- Is inventive
- Has a great imagination
- Is creative, full of original ideas
- Likes artistic and aesthetic activities
- Likes to think and play with ideas
- Has great knowledge about art, music or literature
- Is interested in a lot of topics

The Openness variable is the sum of all the answers.

[10]Risk aversion is measured by the following questions: What do you prefer?

- Option A: Win 10€ if you draw a red ball in an urn composed by 100 black and red balls in an unknown proportion (between 0 and 100) or Win 0€ if you draw a black ball in that same urn.
- Option B: Win 5€.

[11]Impatience is measured by the following question: What do you prefer ?
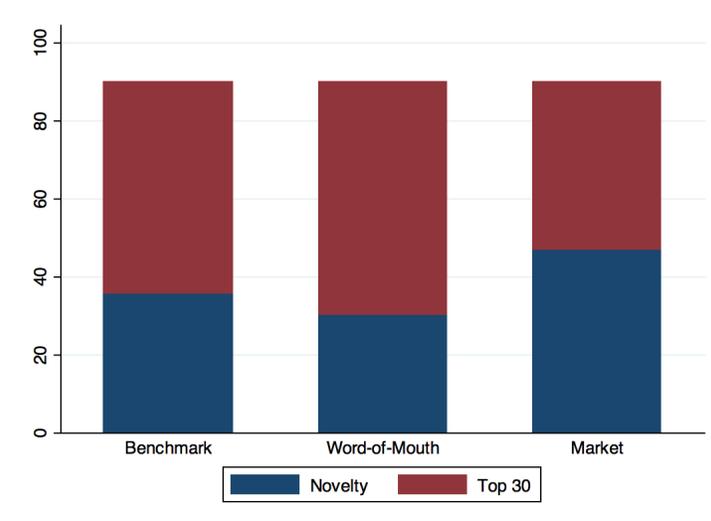
- Win 10€ now
- Win 11€ tomorrow.

Figure 3 – Average Consumption of Novelty by Treatments (in sec)

concentration of consumption.

The market treatment has a positive and strong effect on the demand for new artists' productions. Indeed, subjects listen to 47 seconds of the Novelty category on average, versus 30 seconds in the Benchmark treatment (a two-sided ttest yields p<0.001). Since novelty is always cheaper than the Top 30 category, incentives to buy it actually drive subjects to consume it more.
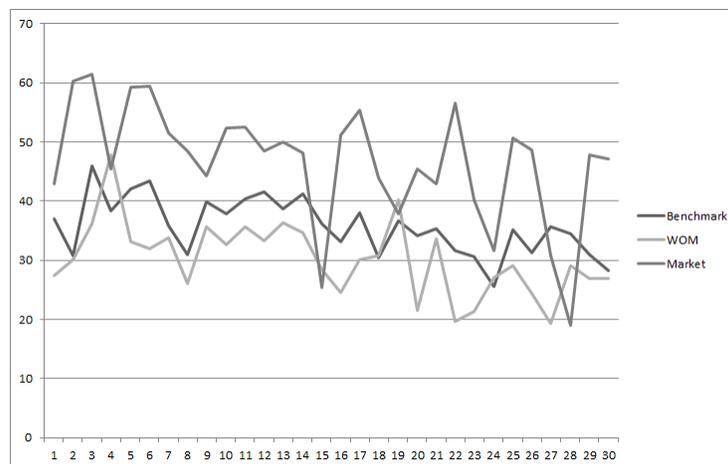

Figure 4 – Average Consumption of Novelty by Treatments and Round (in sec)

Figure 4 shows the average consumption of the Novelty category by treatments and rounds. If we look closely to the graph, we can see that, for all treatment, the first part of the experiment is characterized by a higher level of time spent on the Novelty category. It seems that from the 1st to the 15th round, subjects tend to listen to a bit more of the Novelty category maybe because they are more inclined to try novelty.

3.2 Estimations

To confirm these descriptive results, we uses an OLS regression analysis, clustered on individuals (see Table 2). The first column (1) only contains two dummies as explanatory variables corresponding to the WoM and the Market treatment. The dependant variable is the time spend listening to the Novelty category enhancing the effect of the WoM treatment and the Market treatment[12]. In Column 2, we add variables as controls. While the first treatment has a significant negative impact, lowering the expected time dedicated to novelty (+5seconds), the second has a significantly positive impact, raising the expected consumption (+14 seconds). There is also a significant effect of the beginning of the experiment such that the expected value of the time spent on the Novelty category is about 6 seconds higher during the first 15 rounds. It seems that there is an exploratory period where subjects wish to try more novelty. While all the control variables for listening habits are no significant effect, the exposure to mainstream radios, that broadcast generally the Top 30 songs, has, without surprise, a negative impact on the expected time dedicated to the Novelty category. Finally, all things being equal, choosing the Novelty song first has an important positive impact on the expected listening time (+17seconds).

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[12]Note that to regress the time spent on the Novelty category is similar to regress the time spent on the Top 30 as the two variables are complementary.

Time spent on the Novelty Category		
VARIABLES	(1)	(2)
WoM	-5.440*	-5.381**
	(3.262)	(2.609)
Market	11.417***	14.008***
	(3.901)	(3.384)
Mainstream radio		-3.557*
		(2.092)
Novelty First		17.433***
		(3.434)
round_1_15		5.679***
		(1.266)
Female		-2.119
		(3.523)
Age		3.349
		(3.229)
Constant	35.702***	-18.268
	(2.057)	(50.498)
Control variables for musical listening habits	NO	YES
Observations	3,129	3,069
R-squared	0.054	0.195

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2 – OLS estimations of Time Spent on New Songs

4 Effects on Individual Diversity

4.1 Descriptive data

In this section, we focus on individual diversity. Figure (5) shows the distribution of time spent on Novelty over the sample. We can see that the distribution is flatter in the WoM and the Market treatments, meaning that more subjects specialize their average consumption.

To study individual diversity on consumption, we calculate a Herfindahl Index which illustrates the taste to diversify one's listening toward the Novelty and the Top 30 categories.
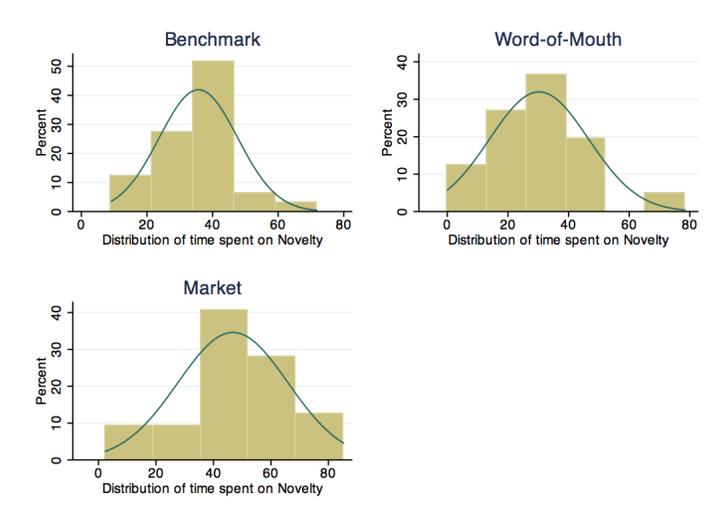
Figure 5 – Distribution of time spent on Novelty over the sample by treatment

For instance, more than 50% of the Benchmark sample listened to the Novelty treatment between 35 and 55 seconds on average.

It is measured by $H_i^t = \Sigma_{j^2} Share_{ij}^t$ where $Share_{ij}^t$ denotes the share of consumption of category j for individual i at period t. Someone who diversified his/her consumption across the two categories has a Herfindahl index of 0.5 while, conversely, someone who concentrated on only one category has a Herfindahl index of 1. In Table (3), we can see that over the experiment, the mean level of the Herfindahl Index is significantly higher in the Word-of-Mouth treatment as in the Market treatment meaning that sujbects seem to specialize their consumption in one of the two categories. One can notice that, in the Benchmark treatment, which is a free choice condition, the average individual Herfindahl Index is close to perfect diversity.

Herfindahl Index	Benchmark	Word-of-Mouth	Market
Mean	0.66	0.75	0.80

For all the two sample ttest, $p < 0.001$

Table 3 – Average Herfindahl Index by Treatment

Figure (6) clearly shows that when subjects are confronted with information, either on others' evaluations or on prices, their consumption is more concentrated.
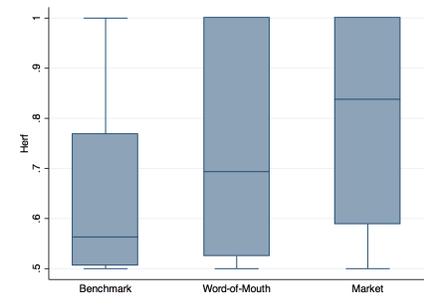
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Figure 6 – Box plot of the Herfindahl Index by Treatment

4.2 Estimations

We estimates with an OLS clustered on individuals the Herfindahl Index that is calculated for each period (see Figure (4)). We can see that there is a negative significant effect of both treatments on diversity of individual consumptions. It seems that it becomes too risky or too costly to shift to the other song once you chose one. The market tend to really discriminate consumption through willingness-to-pay. Also, we see that choosing the novelty category first has a positive impact on diversity in consumption as well as the beginning of the experiment. We can also see that subjects who have a higher score of openness have a significantly lower Herfindahl index.

5 Discussion and Conclusion

This paper attempts to replicate choice conditions where demand meets two types of music products: superstars and niches productions. The results of the experiment shows that others' opinion strengthen the stardom effect as the demand concentrates more on the Top 30 category. This confirms the existing literature. Indeed, there can be two origins of this phenomenon: either people on others choice to make the best choice (Bikhchandani, Hirshleifer and Welch, 1992, Banerjee, 1992), either people benefit from coordinating with others thanks to community sharing (Adler, 1985). In the two cases, there is a tendency to imitate others' behavior and to consider others' opinions. With information, popular products tend to be more popular. In our experiment,the information is most of the time in favor of the

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	Herfindahl Index	
	(1)	(2)
VARIABLES	Herf	Herf
WoM	0.092***	0.076***
	(0.031)	(0.026)
Market	0.143***	0.132***
	(0.029)	(0.030)
Mainstream radio		-0.006
		(0.015)
Novelty First		-0.084***
		(0.019)
round_1_15		-0.035***
		(0.008)
Openness		-0.006*
		(0.003)
Female		0.003
		(0.026)
Age		0.018
		(0.023)
Constant	0.660***	0.457
	(0.020)	(0.376)
Observations	3,129	3,069
Control variables		
for musical listening habits	NO	YES
R-squared	0.072	0.199

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4 – OLS estimations on the Herfindahl index

Top 30 category [13].

Our experiment also shows that, when replicating a market condition and prices, there is more diversity in the demand. This goes against Adler's theory supposing that new artist cannot entice the demand even with a lower price. We found that with incentives in favor of the Novelty category, the demand structure change toward more diversity. In the mean

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[13]The Novelty category shows more stars than the Top 30 category for only two rounds.

time, these incentives tend to specialize one's consumption because it raises the individual Herfindahl Index. It discriminates subjects behavior according to their own maximization program.

One first important result is that, in a free choice condition, there is a demand for new artists. This result is not easy to stress in the real industry because there are exogenous variables that determine demand. It is even more surprising that teenagers are usually important consumers of the Top 30.

From these results, we can infer public policies recommendations. It remains difficult to control evaluation of songs on digital platforms but it is possible to subsidy niches consumption. These subventions can have real incentives to promote diversity.

What would be interesting in such a framework is to measure more precisely the level of satisfaction. The level of arousal and pleasure are variables that can be measured to approximate satisfaction (Bradley and Lang, 1994), beside the self-declared satisfaction. This way, we could compare the impact of information and incentives on satisfaction.

In this article, we show that using experimental methods, we can study the stardom effect and cultural diffusion. The overall distribution of choices across niches and popular songs is more asymmetric in presence of information of others' opinion while market seems to promote diversity. An analysis of a Herfindahl index shows that when people are faced with information or incentives, they concentrate more their consumption on one category.

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