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Abstract:

Information can increase the quality of decision making. However, some individuals might systematically be less likely to pay attention to such information. Previous research suggests that a "scarcity mindset" focuses attention on immediate needs, leaving less cognitive bandwidth for attending to other information. In this article, we examine the relationship between inattention to information and two types of scarcity – financial and social. We use survey data collected shortly after the onset of the pandemic from 345 low-income parents and from the directors of the 11 preschools attended by the children of these parents. To measure inattention, we compare what information parents report receiving from the school with the information schools report sending. We measured financial scarcity, i.e., a self-report of not having enough money to make ends meet, and social scarcity, i.e., a self-report of loneliness. We find that both types of scarcity are significantly, positively, and independently associated with inattention.

JEL Codes: D83, D91, I20, J10.
Keywords: Information, Inattention, Scarcity, Early Childhood Education

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1. Introduction

Perfect information is an often-made assumption in many economic models (competitive markets, strategic interactions, etc.). Providing information is therefore a potentially useful intervention to increase the efficiency of markets. However, even if an institution communicates information, it might be systematically missed by some people – perhaps even those who might have benefited most from receiving it. In this article we examine the second of these components.

Researchers from a variety of fields seek to explain why people may not attend to information that they have access to. One theory, drawing from behavioral economics, argues that attention to information can be limited by mental "scarcity" arising from the feeling of "having less than you feel you need" (Mullainathan & Shafir, 2013). The foundation of the idea of scarcity is that people have limited cognitive bandwidth. When cognitive bandwidth is deployed to deal with financial or social concerns, it is not available for attending to information that could have important benefits. This leads to suboptimal decision making.

In this article, we follow the terminology of previous research (De Bruijn & Antonides, 2021; Mani et al., 2013; Mullainathan & Shafir, 2013; A. K. Shah et al., 2015) in using the term "scarcity" to mean scarcity of cognitive bandwidth brought about by factors that divert cognitive bandwidth from optimal decision making. We estimate the association between inattention and two forms of scarcity: financial and social. Like the previous research (Hilbert et al., 2022; Mani et al., 2013; Mullainathan & Shafir, 2013; A. K. Shah et al., 2015), we measure financial scarcity as a self-reported feeling of not having enough money to make ends meet. Similarly, we measure social scarcity as a self-reported feeling of loneliness. Note that in the scarcity research, it is the *perception* of scarcity, and not necessarily the number of resources, that impedes decision making. Distinguishing among different aspects of scarcity is important if different types of scarcity require different policy responses.

We examine whether low-income parents who experience financial or social scarcity are less attentive to information sent by their children's preschools during COVID-induced school closures. The 11 Chicago preschools attended by the children of 345 parents in our sample closed on March 17th, 2020 following the announcement of a statewide stay-at-home order. We surveyed preschool center directors asking them what information they sent home to parents to

support their children and families while centers were closed. We also surveyed parents asking them what information they received from the centers. Inattention was measured as parents not reporting that they received information that preschools said they had sent. In principle, this provides an objective, rather than self-reported, assessment of parents' attention to information during a period of substantial economic and social disruption.

We find that both types of scarcity are significantly positively associated with inattention to information and that financial scarcity and social scarcity are independently related to inattention. Parents who report financial scarcity and social scarcity are 63% more likely to be inattentive to information than parents who experience neither financial scarcity nor social scarcity. These associations are robust to controls for parental education, household size, whether the household has internet access, and school fixed effects. This study provides a strong suggestion of the link between a scarcity mindset and inattention that is intended to encourage future research that can provide a stronger causal conclusion.

Previous studies on this topic typically use performance on a test given by the researchers to measure inattention. This leaves unclear whether the inattentiveness observed extends to areas of one's life outside of the lab. Our study contributes to the literature by using a real-world measure of inattention, which helps assess the generalizability of lab measurements to the field (external validity). The context of education has (non-monetary) stakes that are much higher than a laboratory (monetary) measurement, and our outcome measure presents a unique way to capture inattention in this setting.

In the following sections of this article, Section 2 describes the context of the COVID-19 pandemic as well as the literature on scarcity. Section 3 describes the sample and variables. Section 4 present our results and Section 5 discusses the findings, limitations, and policy implications.

2. Background

2.1 COVID-19

The COVID-19 pandemic increased the amount of financial scarcity among parents because of the widespread number of job losses, illness among household members, and the loss of social networks (Alifano et al., 2020; Baddeley 2020a, 2020b; Ganong et al., 2020; Garafas 2022; Kalil et al., 2020; Yilmazkuday 2020). Social scarcity was deemed a public health crisis

even before the pandemic, and a recent synthesis of international research shows small but robust increases in social scarcity during the COVID-19 pandemic (Attanasi et al., 2021; Ernst et al., 2022), particularly among low-income individuals and other groups already at higher risk for social scarcity (Bu et al., 2020).

The onset of the pandemic also resulted in the need among parents for new information and new ways of obtaining it. Information about online learning for children and options for substitute childcare became especially relevant for parents. Many preschools provided important information to parents and for some types of information (i.e., online learning) preschools were likely parents' sole source of information. The increased need for some kinds of information and the increased chance of both financial and social scarcity make the unfortunate circumstances associated with pandemic ideal for testing the role of scarcity on attention to information.

2.2 Scarcity Mindset

This research follows Mullainathan & Shafir (2013) in which financial scarcity leads to attentional neglect, a process in which stress may play a role (Zhao & Tomm, 2018). The primary assumption of the theory of scarcity is that people have limited cognitive bandwidth. Attention to information requires cognitive bandwidth. When cognitive bandwidth is diverted from attention to information that optimizes decision making by worrying about making ends meet or about social relationships, it can lead to suboptimal decision making (Fehr et al., 2019; Huijsmans et al., 2019; Lichand & Mani, 2020; Mullainathan & Shafir, 2013; Ong et al., 2019; Plantinga et al., 2018).

Studies of scarcity most often use controlled lab experiments (De Bruijn & Antonides, 2021). For example, Shah et al. (2015, 2019) experimentally induced "time scarcity" among participants competing in a video game. Participants who were under more time pressure spent more time on each move compared to their competitors who were under no such pressure. Less frequently research on scarcity is in the field. Mani et al. (2013) show that Indian sugarcane farmers perform more poorly on tasks of cognitive attention just before the harvest, a time of substantial financial scarcity, compared to their performance just after the harvest when they are flush with income.

3. Method

3.1 Survey Methodology

The sample for this study includes 345 parents whose children attended 11 subsidized preschools in Chicago. We recruited this sample through an ongoing study of low-income parents (Kalil et al., 2023). Of the 594 parents in the ongoing study, 494 (83.16%) had a valid phone number in May of 2020. We asked these parents to take a special survey about their experiences near the beginning of the COVID-19 pandemic and 384 parents completed the survey (with a 77.73% response rate from the parents who had valid phone numbers). Survey data collection began in May 2020 and ended in July 2020.

We attempted to survey administrators at the 13 preschools attended by children of parents of the study of Kalil et al. (2023) and received responses from 11 of the administrators. This left us with a sample of 345 parents for whom we had data from both the parent and school administrator. 92% of the parents in this sample are the mothers of the preschool child, and their average age is 32 years. 66% have a high school diploma or general education diploma, 41% have at least some college, and 12% have a bachelor's degree. 32% of parents identify as black, 32% as white, and 36% as Hispanic. 38% speak Spanish as their primary language. The median household income is around $20,000. These sample characteristics resemble that of the broader set of Chicago parents with children in subsidized preschools (Illinois Early Childhood Asset Map, 2022).

All parents received a text message with a link to complete the survey online or via phone. 30 parents opted out and 13 did not respond. 59% of parent surveys were completed by phone and 41% were completed online. The average duration of the phone survey was 21 minutes.

3.2 Measures

3.2.1 Dependent Variable

Inattention. Inattention occurs when a preschool administrator reports providing information to a parent but the parent does not report receiving it. We asked administrators about seven kinds of information: (a) preventing the spread of COVID-19, (b) accessing meals, (c) accessing the internet and technology, (d) online learning, (e) managing stress, (f) accessing social services, and (g) finding childcare.

Inattention can occur because a parent received the information but ignored it or because the parent received the information but did not remember receiving it. We created two measures of inattention. The first reflects the view that missing any information at all is indicative of inattention. This is a binary variable with a value of "1" for a parent who, for *at least one* category, said he or she *did not* receive information when the administrator said the school *did* provide the information. The second measure is a continuous version, computed as the proportion the types of information that a preschool reported sending that the parent did not report receiving.

Note that if a parent said the information was provided but the administrator did not say she sent it, we did not count this as inattention because our focus is on cases where parents missed information that was reportedly sent. The proportion of parents who said that they received information when administrators said she did not send such information is negligible, ranging between 3% and 8% depending on the information type.

Our measure of inattention assumes that when a preschool administrator said information was sent this was actually done and in a way that parents could receive it. Because the percent of parents within a school who report receiving each type of information that administrators said they sent is very high – always over one half and usually over two-thirds – we believe the assumption is met. This does not necessarily mean that every parent received the information. In these preschools the most common way for information to be sent is through text messages because almost all parents have a phone that can receive messages. It is very likely that messages sent by text were received by the parents in this sample because our research team communicated with these parents via text messages using the same phone numbers as the preschools and all parents in the sample responded to the texts assuring that the phone numbers were correct and the phones operational. That said, we cannot rule out that what we count as inattention might sometimes be a case where the parent did not receive the information.

3.2.2 Independent Variables

Financial Scarcity. De Bruijn & Antonides (2021) note that almost all cross-sectional and quasi-experimental studies of financial scarcity use income as the measure of financial scarcity, which they call a "remarkable mismatch" given that Mullainathan and Shafir (2013) conclude that income is "at best a crude proxy for scarcity" (p. 72). Following Mullainathan and

Shafir (2013), our measure of financial scarcity is respondents' reports that they lack enough money to make ends meet each month. Individuals at any level of income can feel financial scarcity if their needs outpace their means.

To measure financial scarcity, parents were asked, "Think about (last month): Which of these statements best describes how much money you had left over at the end of (that month)? Response options included "Some money left over," "Just enough money to make ends meet," or "Not enough money to make ends meet." We created an indicator for "not enough money" to make ends meet (24.3% of our sample), which corresponds to Mullainathan and Shafir's definition of scarcity.

Social Scarcity. We measure social scarcity by parent's feelings of loneliness. Parents were asked "How often do you feel lonely these days?" and were asked to choose among "never", "sometimes", "often", and "all the time." 67% said "never," 24% said "sometimes," 5% said "often," and 3% said "all the time." We create a binary variable for social scarcity equal to 1 for parents who responded "often" or "all the time," and 0 otherwise. Our main findings below do not change if we define social scarcity to include parents who report "sometimes" feeling lonely.[2]

3.2.3 Covariates

We control what are arguably exogenous factors that might be correlated with a parent's financial scarcity or social scarcity and affect the likelihood of inattention to information. These include whether the parent had internet access, a college education, and the household size.

No Internet. This is a dummy variable equal to 1 if parents said they did not have consistent access to internet at home (9.9% of the sample). We speculated that parents' financial scarcity might affect their ability to afford internet service and that the internet was a potential means of receiving information, and possibly helping to maintain or foster social connections.

Education. This is a dummy variable equal to 1 if the parent reported having at least some college education, and 0 otherwise. This was 41.4% of the sample. Parents' education is negatively correlated with both their financial scarcity and social scarcity (Bu et al., 2020).

[2] These additional analyses are available from the authors upon request.

Higher-educated parents might also be more likely to attend to information sent from their child's school.

Household Size. This is the self-reported combined number of adults and children living in the participant's household. The average household size was 4.7. We speculated that household size is positively correlated with financial scarcity, negatively correlated with social scarcity (insofar as it offers greater access to social connections) and that larger households might demand more attention from the parent, reducing attention to information.

School fixed effects. We estimate the within-school effect of scarcity on inattention to account for possible differences across schools that might affect both scarcity and inattention.

3.3 Missing Data

Each survey question included an option for "I don't know" and for "Prefer not to answer." We count either one as missing data. Table 3 shows that for most of our variables, there was little or no missing data. We used multiple imputation (using the variables for which there were no missing observations) following the code and method outlined in Stata User Guide[3] to impute missing values. This gives us an analytic sample size of 345 for each variable. Our results were qualitatively similar when running the analysis with or without imputation. [4]

4. Results

4.1 Descriptive Results

The first panel of Table 1 shows the proportion of schools that provided each type of information. All schools provided information on accessing meals whereas only 82% of schools provided information on childcare. The second panel shows the proportion of parents who said they did not receive information when their school said they had sent it. Very few parents reported not receiving information about meals or online learning whereas 43% reported not receiving information about childcare. Table 2 shows the percent of parents who reported not receiving information by the type of information. The modal parent attends to all the information whereas one-third of the parents have two or more instances of inattention. Our sensitivity

[3] https://www.stata.com/stata11/mi.html

[4] The analyses without imputation are available from the authors upon request.

analysis shows that the main results are qualitatively similar if we specify the outcome continuously as the proportion of information missed (see the "inattention rate" variable).

(Table 1 here)

(Table 2 here)

The inattention rate in Table 3 shows that on average parents missed 21% of the information schools said they sent. The binary variable "inattention" indicates that 57% of parents missed information in at least one category. 24% of families had financial scarcity and 8% of parents had social scarcity. The correlation between financial and social scarcity is very low (0.0032).

(Table 3 here)

4.2 Regression Results

Our main results use the following OLS model, interpreted as a linear probability model, to estimate the relationship between inattention and scarcity:

$$I_i = \beta_0 + \beta_1 F_i + \beta_2 S_i + \alpha X_i + \gamma_j + \varepsilon_i$$

Where I_i is inattention for individual i, F_i indicates the financial scarcity, S_i indicates the social scarcity, X_i is the vector of covariates (internet access, education, and household size), and γ_j is the school fixed effect for school j. Our primary parameters of interest are β_1 and β_2, i.e., the coefficients of financial and social scarcity, respectively.

The results of this model are shown in Table 4. The first two columns show the associations between inattention and financial scarcity and social scarcity separately, and the third column includes both variables together. Experiencing either social scarcity or financial scarcity is associated with an increase in inattention by about 16-17 percentage points. Neither the magnitude nor statistical significance for either financial scarcity or social scarcity change much when the other variable is included in the model. It is also worth noting that lack of internet access appears to be associated with inattention; however, this relationship is not

statistically significant when the regression includes financial scarcity. This tells us that the relationship between financial scarcity and inattention is not fully explained by lack of internet access.

(Table 4 here)

Table 5 shows the same models as Table 4, except predicting the inattention rate rather than a binary measure of inattention. The "inattention rate" is the total number of kinds of information missed by a parent divided by the number of kinds of information provided by their school (seven for most parents; six or five for the rest: see the upper part of Table 1). The results are qualitatively similar in that both financial scarcity and social scarcity are associated with the inattention rate and with similar magnitudes, although both lower than in the model of Table 4.

(Table 5 here)

To further explore how financial scarcity and social scarcity relate to inattention, we sorted participants into four mutually exclusive categories: those with neither financial scarcity nor social scarcity, those with just financial scarcity, those with just social scarcity, and those with both financial scarcity and social scarcity. The share of inattention in each of these groups is, respectively, 51%, 69%, 70%, and 83%. This is shown in Figure 1. We also estimated an interaction term between financial and social scarcity using the main regression, and its coefficient was statistically insignificantly different from zero (p-value = 0.89). This pattern of results underscores that financial scarcity and social scarcity are largely independently associated with inattention.

(Figure 1 here)

5. Conclusion

Our results suggest that both financial and social scarcity are associated with greater inattention to information and that each independently predicts inattention. The chance of missing information rises by 63% – from 51% to 83% (see Figure 1) – when parents experience

both financial scarcity and social scarcity, although only a small share of parents in this sample have both characteristics. In this study we cannot measure the consequences of inattention to this information, but because the schools sent information relevant to coping with the consequences of the COVID-19 pandemic, parents may have missed out on the chance to relieve the very scarcity they were experiencing. While the overall inattention rate is only about 21%, about half of parents who neither experience financial scarcity nor social scarcity missed at least some information sent by the schools. Clearly factors besides financial and social scarcity are associated with inattention and identifying these is important. We leave this to further research.

Our results are based on survey data, which has both advantages and disadvantages. These data provide a longer time horizon than the typical laboratory experiment in which an experimenter induces financial worries and ask respondents to attend to information. This reduces the possibility that factors other than the primed scarcity affect attention, but it captures only a short-term response. Conversely, our survey data cannot assure that scarcity is the only cause of inattention, but it assesses the potential effect of scarcity on inattention over several weeks. This longer time period introduces the possibility that inattention results from forgetting as well as never attending to information and both may be important forms of inattention. The survey data also allows us to contrast financial scarcity with social scarcity, which is another mechanism thought to consume cognitive bandwidth. This research provides suggestive evidence of long-term effects of scarcity and of the role of other important sources of limitation on cognitive bandwidth besides financial worry and as such should be taken as suggesting future research that can claim causal inference.

This research also provides evidence of the role of scarcity in a real-world setting and with an important set of decision makers. Most studies of inattention occur in a laboratory setting using a variety of stylized measures of inattention (see Gabaix 2019 for a summary of common measures of inattention). The measure of inattention in this article has potential and concurrent consequences for the decisions that parents make about the well-being of their children. The data is from the height of the COVID-19 pandemic when financial scarcity, social scarcity, and parental attention allocation were particularly salient. Focusing on inattention among parents extends applications of theories of inattention to a group that makes essential and consequential decisions and thus has especially important potential applications.

The measure of inattention in this article provides a novel tool to measure an important concept in economics, psychology, and other disciplines. It is well-known that information alone seldom changes behavior, and one reason is inattention to information. A measure of inattention that is conceptually valid and easy and low cost to implement provides an avenue for the experimental assessment of the role of numerous other factors that might contribute to inattention and for ways to overcome inattention to important information.

If these results were substantiated in a way that lends itself to a causal interpretation, they could have important practical implications. Financial scarcity and social scarcity may partly explain why information has limited ability to change behavior. Reducing both may increase attention to information but it may also be the case that changing the way information is delivered or received may reduce the impact of scarcity. In some contexts, modifying the decision environment through the design and presentation of information (in modality, frequency, and appearance) affects whether the information captures individuals' attention and prompts behavior change (Allcott & Rogers, 2014; Castleman, 2015; Shah et al., 2022; Slovic, 2010; Thaler & Sunstein, 2009). Future research on how the presentation of information can overcome inattention from limited bandwidth is important for improving decision making.

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Tables and Figures

Table 1
Inattention Variable Description

Variable	Obs	Mean
Information Provided on:		% of schools
Meals	345	100%
Online Learning	345	95%
Accessing Internet	345	94%
Prevent Virus Spread	345	94%
Social Services	345	94%
Stress Management	345	84%
Childcare	345	82%
Inattention to Information on:		% of parents
Meals	345	07%
Online Learning	329	04%
Accessing Internet	325	23%
Prevent Virus Spread	325	09%
Social Services	325	25%
Stress Management	289	40%
Childcare	283	43%

Note: The first panel shows the proportion of parents who paid attention to a school where the administrator said the school provided that category of information. The second panel shows the proportion of parents who said they did not receive that type of information when the school claimed to provide it. Categories with a sample size of less than 345 are due to some schools reporting that they did not provide that category of information.

Table 2
Distribution of Instances of Inattention

Instances	N	Per cent
0	149	43%
1	72	21%
2	45	13%
3	40	12%
4	22	6%
5	13	4%
6	1	0%
7	3	1%

Note: N represents the total number of parents in our sample (out of 345) who had the respective number of instances of inattention (out of seven total).

Table 3
Descriptive Statistics Study Variables

Variable	Obs	Mean	Std. Dev.
Inattention Rate	345	0.21	0.24
Inattention	345	0.57	0.50
Financial Scarcity	321	0.24	0.43
Social Scarcity	336	0.08	0.27
No internet	344	0.10	0.30
Household size	344	4.70	1.69
Some college or more	345	0.41	0.49

Note. All but Inattention Rate and Household Size are dummy variables. The mean for these dummy variables represents the proportion with a value of 1. Observations less than 345 indicate missing data.

Table 4
Estimates of the Effect of Financial and Social Scarcity on Inattention

	(1) Inattention	(2) Inattention	(3) Inattention
Financial Scarcity	0.168***		0.165**
	(0.0646)		(0.0645)
Social Scarcity		0.173*	0.167*
		(0.0944)	(0.0941)
No Internet	0.125	0.187**	0.129
	(0.0836)	(0.0804)	(0.0827)
Some College or More	0.0652	0.0714	0.0666
	(0.0572)	(0.0577)	(0.0571)
Household Size	-0.00524	0.00505	-0.00282
	(0.0162)	(0.0160)	(0.0164)
Observations	345	345	345
Adjusted R-Squared	0.057	0.048	0.065
School FE	Yes	Yes	Yes

Note. Robust standard errors are in parentheses. Inattention is a binary variable with a value of 1 if the parent missed one or more pieces of information (out of seven) sent by the school, and 0 otherwise.
*** p<.01, ** p<.05, * p<.1

Table 5
Estimates of the Effect of Financial and Social Scarcity on Inattention Rate

	(1) Inattention Rate	(2) Inattention Rate	(3) Inattention Rate
Financial Scarcity	0.0672**		0.0654**
	(0.0319)		(0.0314)
Social Scarcity		0.109*	0.107*
		(0.0562)	(0.0553)
No Internet	0.0142	0.0400	0.0172
	(0.0389)	(0.0380)	(0.0385)
Some College or More	-0.00561	-0.00278	-0.00470
	(0.0268)	(0.0266)	(0.0266)
Household Size	-0.0124	-0.00779	-0.0109
	(0.00817)	(0.00818)	(0.00816)
Observations	345	345	345
Adjusted R-Squared	0.070	0.072	0.084
School FE	Yes	Yes	Yes

Note. Robust Standard errors are in parentheses. The outcome variable, Inattention Rate, is defined as the number of pieces of information missed by the parent divided by the total number provided by the school (seven in most cases: see the upper part of Table 1). *** p<.01, ** p<.05, * p<.1

Figure 1
Inattention Rate by Financial and Social Scarcity