

## Stage of Pricing Strategy Predicts Earnings: A Study of Informal Economics

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An individual's income results from the way or ways in which they work and how they are paid. In recent years, income disparities have been rising in a number of countries (e.g., [Piketty & Saez, 2003](#)). A common notion is that income disparity can be reduced by creating equal opportunity for education for all individuals. To put this idea to the test, we examined the relative contributions of education, of country of origin, and of stage of development to people's income. Specifically, the stage of pricing strategies used and the level of education were used to predict income. Participants were individuals who worked in the informal economies within 2 countries: Brazil and the United States. Two groups of people were studied: people who sell things on the sidewalks or at flea markets (peddlers) and people who transport goods (carters). All participants were asked how they set their prices, and how much money they earned either per day, per week or per month. A regression analysis showed that behavioral stage of an individual's pricing strategy and their country of origin were the best predictors of income obtained,  $R(44) = 0.705$ , ( $R^2 = .497$ ;  $F(1, 44) = 20.78$ ,  $p < .0005$ ). Stage and country both contributed significantly to the income obtained; for stage,  $\beta = 0.408$ , and for country,  $\beta = .501$ . A second regression analysis that included education found that education did not significantly predict earnings, over and above stage and country of origin. These results indicate that education by itself may not be enough to increase earnings and decrease income disparities. Unless there are interventions to raise individuals' developmental stage social stratification will likely continue to exist and even to increase.

*Keywords:* hierarchical complexity, stage of pricing, income, culture, social stratification

Income disparity is increasing in many of today's societies. To name one example, in the United States, between 1913 and 1998, the share of income going to the top 0.1% increased nearly fourfold ([Noah, 2010](#); [Piketty](#)

& [Saez, 2003](#)), whereas the share of income going to the lower earning 80% of households (also after federal taxes and income transfers) had dropped to less than [1/2] of the total in 2007 ([Congressional Budget Office, 2011](#)).

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The purpose of this article is to examine one possible factor underlying social stratification, that of reasoning about economic issues. Specifically, the article will show that the stage at which an individual sets their prices will affect the value that they obtain, in terms of the amount of income earned.

### **Political/Moral Arguments About Social Stratification**

Various political/moral schools of thought have proposed different reasons for social stratification and income disparity. Whereas most emphasize environmental factors, centrist determinists emphasize inherited traits as a contributing factor of social stratification (Herrnstein & Murray, 1996). In a study of political attitudes in different groups, Robinett (2006) found that people with different political affiliations think differently about the issue of social stratification. It seems that the more extremist Republicans believe that everyone is basically equal in terms of their abilities, and also that everyone has free will. They believe that income disparity exists because not all people work equally hard. Centrist determinists also believe that economic performance has a large inherited component in that relevant traits are highly transmittable and heritable.

In contrast, liberals hold that in a fair society, income is based on merit. They believe that social class is transmittable and that social stratification exists as a result of unequal opportunity for obtaining education and class and race discrimination (Sluyter, 2003; Tischler, 2011). The moral unfairness in not effectively providing these opportunities to all is key. This view has given rise to a popular notion that social stratification can be minimized by promoting equal opportunity for education and promoting a more multicultural society. This view stresses environmental factors exclusively, as opposed to inherited factors, to explain why some people are successful whereas others are not.

A third view would be a developmental and interactionist view. Developmental psychologists have proposed views that are much more interactional, transactional, or systems-based (e.g., Sternberg, 2004).

### **Developmental-Psychological Basis for Social Stratification**

The current article examines a developmental psychological basis for social stratification. We predict that social stratification may be partially based on differences in the extent to which adults perform economic tasks successfully. The hypothesis is an individual's developmental stage will be related to the pricing strategies that they use. The type of pricing strategy may then influence income, and by extension, the degree of social stratification. Because performance on economic tasks, such as setting prices, is based on whether or not an individual can successfully complete price setting tasks of different difficulties (or to use the term we will introduce, tasks that vary in hierarchical complexity), we will argue that social stratification stems from the inevitable arrangement of market-driven societies according to economic, employment-related, and other tasks that differ in terms of their difficulty. Differences between individuals in their successful completion of these tasks produce increasing disparities in income, wealth and power. As societies develop, the stratification of tasks increase, and the potential for disparities also increases. This may yield a new understanding of one dimension of social stratification. The goal is to show that a market-driven society has work that benefits from being performed at higher and higher developmental stages.

### **Division of Labor and Its Influence on Social Stratification**

Social stratification accompanies division of labor, which is an important characteristic of modern society. It is important to understand the role of merchants in division of labor. Merchants (in the case here, these are peddlers and carters) sell goods and services to make a profit. There are many forms of goods and services, from trinkets, groceries, automobiles, to education and information. Employees may also sell their skills to the labor market. Consumers have the freedom to choose goods and services in the market. There are a variety of factors that may affect the sales of goods and services and profit-making, such as pricing strategy, quality of the goods, technology (to increase efficiency, e.g.), and marketing.

The division of labor started with some of the first human settlements. This can be seen, for example, in an early settlement excavated in Moravia, Czech Republic, 25 to 40 thousand years ago (“[Dolni Vestonice I - the kiln and encampment](#)” 2011). The system of division of labor has grown to be increasingly strong. The specialization of production of goods and services leads to a great amount of exchange and deal-making. Informed consent, or mutual agreement for the exchange of goods and services between sellers and customers, plays an important role in the market place. We argue therefore that the market is based on a complex system of business-like relationships. The deal-making is an informed consent process. Merchants who understand the complex system of relationships are more likely to provide demanded goods and services, price them at the appropriate level, cooperate well with other merchants, as well as more successfully undertaken other business related tasks. We propose here a specific way of quantifying this notion of “understanding the system of relationships” in a market driven economy, in terms of developmental stages.

Both the division of labor and earning more versus less through more or less effective economic activities may lead to social stratification. The notion of social stratification is simply a summary way to say that a particular economy can be composed of a variety of economic tasks that vary in difficulty, and that different individuals occupy different levels of the strata.

### **Some Past Research on Age or Stage Differences in Economic Behaviors**

Some previous studies have shown that economic behaviors are in fact related to age and developmental stages, and so may contribute to the effectiveness of someone’s behavior related to economic issues. [Berti and Bombi \(1981\)](#), for example, showed that there is a developmental sequence for conceptions about the value and use of money in children. These conceptions develop alongside the Piagetian cognitive developmental stages. Moreover, research from a variety of investigators has shown that there are age differences in other economic-related behaviors. [Murnighan and Saxon \(1998\)](#), for example, studied children from kindergarten to high school ages engaging in ultimatum bar-

gaining games and compared their behaviors with those of adults. They found that 3rd graders acted on self-interest and kept more for themselves. Sixth graders preferred equal distribution, which suggested their preference for fairness. Older children and adults preferred equal distribution when the amount to be divided was small, but acted more in terms of self-interest when the amount of money to be divided was large. Although in some ways, therefore, older children and adults were not that different from third graders, there were circumstances in which they would behave in a way closer to what could be considered more optimally.

The results of these studies suggested that with increasing age, children are increasingly able to take others’ perspectives, which is reflected in their concern for fairness. This result is consistent with [Kohlberg and Lickona’s \(1976\)](#) notion of moral development, which describes the development of moral reasoning as proceeding through six stages. At each increase in stage the child takes into consideration the perspective of broader social groupings. Third graders may behave at the pre-conventional stage, when they are oriented by self-interest. Six graders may behave at the conventional stage, when they realize that others have needs as well and develop a preference for fairness. Note, however, that only one of the above studies of economic behaviors directly related the participants’ behaviors to either Kohlberg’s stage conception or to any others. Instead, they focused on age differences. The problem with focusing only on age differences is that, depending on experience with a content area, amount of schooling, and other factors, individuals of similar ages may still differ in developmental stage. Another problem with the above studies of economic behaviors is that they focused primarily on contrived and controlled situations, not real world situations.

The increase in developmental stage may also influence an individual performance in developing a complex business strategy that integrates different business aspects, such as the market demand and strategies of competitors. The current study investigates peddlers’ strategies of pricing their goods and how those strategies relate to their income. This study differs from previous ones discussed above in that it explores the relationship between stage of de-

velopment (rather than age), and income, an actual and real-world socioeconomic measure. Stage of development is measured by applying the Model of Hierarchical Complexity to how peddlers, carters, and others who are selling goods set their pricing strategies. The current study may be the first cross-cultural study of the relationship of stages of development to performance on economic pricing tasks.

### The Relationship of the Model of Hierarchical Complexity to Moral Development and Social Stratification

On the surface, the capitalist marketplace provides a level playing ground for everyone. However, it carries consequences that go unnoticed, by unintentionally stratifying society. For example, differences in access to education and social networks as well as possible genetic differences may lead to unfairness. Here, we will see whether that stratification may be partially based on individuals' stage of performance on tasks that exist in the market place. To understand individuals' stage of performance on tasks, it is important to understand the Model of Hierarchical Complexity. This Model is described in more detail next.

### Model of Hierarchical Complexity

We describe a model to account for the stage of performance of individuals: the Model of Hierarchical Complexity. It is used to measure the hierarchical complexity of tasks, as de-

scribed by the Order of Hierarchical Complexity of a task.

The core of the model is task analysis. Tasks in different domains form sequences from simpler tasks to more complex tasks. A higher order task (a) is defined in terms of two or more tasks at the *next lower* order of Hierarchical Complexity; (b) the higher order task organizes the less complex actions—that is, the more complex action specifies the way in which the less complex actions combine; and (c) the lower order tasks have to be carried out *nonarbitrarily*, not just put together as an arbitrary chain. Once these conditions have been met, we say that the higher-order task *coordinates* the tasks of the next lower order. Figure 1 illustrates the hierarchical structure of tasks as described by the model. The resulting performances of individuals are stage-like. The example shown in Figure 1 is of a hierarchy that spans 3 orders.

*Order of Hierarchical Complexity* characterizes the underlying difficulty of tasks. The higher the Order of Hierarchical Complexity is, the more difficult the task. A task analysis allows for specification of this order. Past research has defined 17 orders of Hierarchical Complexity, as shown in Table 1. People develop through each of these stages sequentially because the stages are *hard* developmental stages (Commons et al., 2008; Commons, Trudeau, Stein, Richards, & Krause, 1998). Table 1 also provides descriptions and examples of the kinds of behaviors and performances that are characteristic of each order/stage of Model

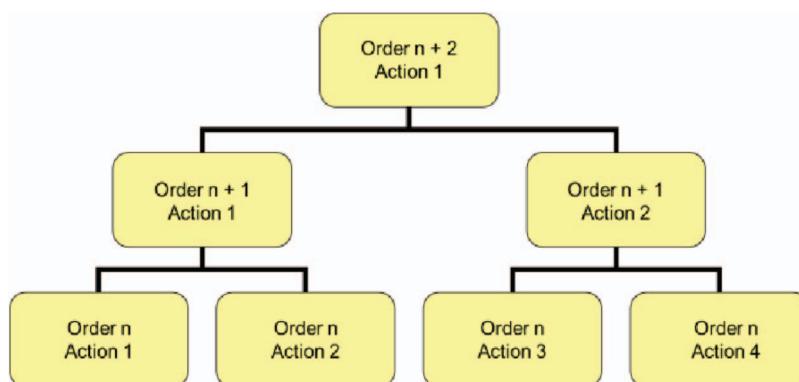


Figure 1. Model of Hierarchical Complexity. See the online article for the color version of this figure.

Table 1  
*Orders of Hierarchical Complexity and Pricing Strategy at Different Stages*

| Order | Name                           | Description   | Examples (verbal/physics)   | Pricing strategies at different stages   |
|-------|--------------------------------|---|---|--|
| 0     | Calculatory                    | Machines can do simple arithmetic on 0s and 1s.   | All the selling is programmed in by programmers, and the designers of the programs.                         | This is all done by the program designers and the sellers who use the service. What one observes is the actions of the high stage peddlers online. |
| 1     | Automatic                      | Tasks include reflexes, sensitization, habituation, tropisms. Engages in one action at a time.  | Absorption of glucose by cells.   | Cannot be a peddler.   |
| 2     | Sensory & motor actions        | Infants may see or touch shapes, make generalized discriminations, as well as babbling vocalizations.   | Either seeing circles, squares, etc. or instead, touching them.   | Cannot be a peddler.   |
| 3     | Circular sensory-motor actions | Reaching and grasping object they see. These actions generate simple gestures.  | Reaching and grasping a circle or square.   | Cannot be a peddler.   |
| 4     | Sensory-motor                  | The actions become associated with vocalizations. Concepts of shape and color built out of reaching for object they see with common properties. | An infant may hold up an object and make sounds while doing so.   | Cannot be a peddler.   |
| 5     | Nominal                        | First single words are formed as representations of concepts.   | Words such as "cup" or "water" relate concepts to others. The word "one" may be said.                       | Cannot be a peddler.   |
| 6     | Sentential                     | Toddlers form short sentences and phrases. The use of pronouns develops, and a few numbers and letters are said in order as well.               | Sentences might be "want water," "cup of water," etc., responding differently to "hit ball" and "ball hit." | Cannot be a peddler.   |

Table 1 (continued)

| Order | Name            | Description   | Examples (verbal/physics)  | Pricing strategies at different stages  |
|-------|-----------------|---|--|---|
| 7     | Pre-operational | Sentences formed at the sentential stage are organized into paragraph long utterances. Counting of objects in a line but with failure to stop when the last object has been given a number.                                   | Tell parts of stories made out of sentences. These can be real or fanciful.  | Cannot be a peddler.  |
| 8     | Primary         | Paragraph long utterances are organized into stories which may be matched to reality.   | Can follow orders told to them in story form. Can carry out a relatively long sequence of actions told to them to carry out. Counts accurately to large numbers.   | Peddlers do not control their prices: Either someone sets the price for them, or they take whatever someone offers.   |
| 9     | Concrete        | Two primary stage operations may be coordinated. Counting, adding, and multiply allow for long multiplication and long division.  | Children think that a deal is fair after looking at from the perspective of simple outcomes for each person who is entering the deal. Negotiations make sense but there are not social norms for setting prices or values. | They set their price by adding an amount to the price they paid, or by negotiating with each individual buyer.  |
| 10    | Abstract        | Variables, stereotypes, personalities, traits, etc. are introduced. The dimensionalized qualities may be used to express preferences. Calculate price when the formula only has to have the values of the variable filled in. | Quantification words like "everyone in my group," "What would other's think?" appear.  | They set their prices based on norms. They know what others are charging and they match or beat that price.   |
| 11    | Formal          | Discussions are logical and empirical support is logical brought. Solves univariate equations.  | Words like "if . . . then," "in every case, it turned out the same," "the reasons were" occur.   | They set prices based on a proportional markup. They add a proportion of what they paid for the goods to the price. If they do not sell at this proportion, they stop buying the item to sell. Most people who employ this strategy use numerical percentages. <i>(table continues)</i> |

Table 1 (*continued*)

| Order | Name           | Description  | Examples (verbal/physics)  | Pricing strategies at different stages   |
|-------|----------------|--|--|--|
| 12    | Systematic     | The new concepts are referred to as 3rd order abstractions. These coordinate elements of abstract systems. | Words like bureaucratic, capitalist, functional, and structural are common. The systematic stage concept, structure, for example, can be employed to ask whether the structure of camp helps instill the qualities we want in future citizens. The logical structure of this stage coordinates multiple aspects of two or more abstractions, as in: "relationships are built on trust and though we cannot always keep them, making promises is one way we build trust, so it is generally better to make promises than not to make them." Here, the importance of trust to relationships, building trust, and the possibility that promises can be broken, are all taken into account while formulating the conclusion that promises are desirable. | People use multiple factors to set prices. This often includes having a marketing strategy. They understand how the markets they sell in work. They are especially good at dealing within the markets in which they acquire their goods. The consider multiple factors such as margin, the size and cost of their inventory, the cost of lost opportunity from running out of goods. They also can run a business with many peddlers working for them. |
| 13    | Metasystematic | The new concepts are referred to as 1st order principles. These coordinate formal systems.                 | Words like autonomy, parallelism, heteronomy, and proportionality are common. The metasystematic stage concept of parallelism, for example, can be employed to compare the structures of the military and of camp as institutions. The logical structure of this stage identifies one aspect of a principle or an axiom that coordinates several systems, as in: "contracts and promises are articulations of a unique human quality, mutual trust, which coordinates human relations." Here, contracts and promises are seen as the instantiation of a broader principle coordinating human interactions.   | Pricing strategies involve being able to compare and choose between different business models. There is an understanding of selling to what people want and not just what they might need. They learn how to assess what they want in different classes, cultures at different price points.   |

Table 1 (continued)

| Order | Name                  | Description  | Examples (verbal/physics)  | Pricing strategies at different stages   |
|-------|-----------------------|--|--|--|
| 14    | Paradigmatic          | <p>People create new fields out of multiple metasytems. The objects of paradigmatic acts are metasytems. When there are metasytems that are incomplete and adding to them would create inconsistencies, quite often a new paradigm is developed. At the cross-paradigmatic, paradigms are coordinated.</p> | <p>An example is the wave equation as it is derived by coordinating the three metasytems: Newton's law of motion, the Continuity Equation and the Ideal Gas Law.</p> | <p>New product and service ideas are introduced and sold. These have to combine metasytems such as drawing in painting with movement as in movies, to tell stories. The web grows out the internet and email by having content attached to addresses open to all and searchable.</p> |
| 15    | Crossparadigmatic     | <p>Crossparadigmatic actions integrate paradigms into a new field or profoundly transform an old one. A field contains more than one paradigm and cannot be reduced to a single paradigm.</p>  | <p>An example is string theory as it combines quantum physics and the theory of general relativity.</p>  | <p>Combining paradigms associated with computer graphics with the paradigms of animation and storytelling. This starts new industries.</p>   |
| 16    | Metacrossparadigmatic | <p>Metacrossparadigmatic actions reflect on various properties of crossparadigmatic actions seeing with the crossparadigms are consistent, possibly true and determining other properties of crossparadigms.</p>   | <p>Show that String Theory and Membrane Theory are incomplete because they do not account for dark matter and dark energy.</p>                                       |  |

of Hierarchical Complexity. In addition, the table includes pricing strategies that are characteristic of different orders of MHC.

*Stage of Development* is defined as the highest *Order of Hierarchical Complexity* of a task that an individual successfully completes in a particular domain. The concept of stage of performance differs from that of IQ, particularly in how it is measured. Stage of development is based on an individual's performance on a task at a specific level of hierarchical complexity and is not based on psychometric norms, as is IQ. Whereas IQ and Piagetian stage instrument performance have been shown to be moderately related in children (see [Chen & Commons, 2014](#), for a summary of these findings), there are no data as of yet on the relationship of IQ and stage of development as measured using the Model of Hierarchical Complexity. Also, stage is not a static measure, but something that develops across the life span.

There have been a number of studies showing the validity of the Model of Hierarchical Complexity as a system to analyze the hierarchical complexity of tasks in various domains. [Dawson \(2004\)](#) conducted a study in which she compared three different scoring schemes in scoring 152 interviews of the development of epistemological reasoning in engineering undergraduates. She found that the scores of interviews using the Hierarchical Complexity Scoring Scheme (HCSS; [Commons, Miller, Goodheart, & Danaher-Gilpin, 2005](#)) were consistent with those using the Lexical Abstraction Assessment System and the Perry Scoring System. However, because HCSS was content-free, it had the advantage of eliminating the problem of developing comprehensive domain-specific scoring schemes.

[Commons, Goodheart, et al. \(2008\)](#) created the balance beam instrument to assess stage of development in the physical science domain. It consisted of multiple choice questions that differed in their Orders of Hierarchical Complexity, from Primary 8 through Metasystematic 13. Rasch analysis was conducted to yield the Rasch Scaled Item Difficulty based on the rate of correct answers. The result showed that the predicted Orders of Hierarchical Complexity of the items predicted the observed difficulty of items with an  $r$  of 0.88.

Other studies have shown the relationship of Hierarchical Complexity to social perspective-

taking. For example, [Commons, Goodheart, Rodriguez, and Gutheil \(2006\)](#) conducted a study of the informed consent process between health care providers and patients. The instrument consisted of six vignettes of how different health care providers informed the patient and obtained consent. Each health care provider represented a different Order of Hierarchical Complexity of social perspective taking, starting from a lower order (Concrete) to a higher order (Metasystematic). It was found that health care providers who were described as doing informed consent at higher stages of social perspective taking were perceived to be less likely to be sued for a bad outcome and for less money than health care providers who had lower stages of social perspective taking.

[Commons, Galaz-Fontes, and Morse \(2006\)](#) studied moral reasoning in illiterate adults in Baja California, Mexico and high school students in Mexico. They interviewed participants and presented two moral dilemmas. The answers were scored using the Hierarchical Complexity Scoring Scheme (HCSS). It was found that leadership and cross-cultural educational experience were associated with higher stages of moral reasoning. Based on this study, and the other studies described above, it seems likely that other kinds of behaviors, including pricing strategies, may differ between individuals in different countries and with different educational backgrounds.

### **Model of Hierarchical Complexity and Social Stratification**

There is stratification to varying degrees in different countries. Research in adult development ([Newman, Tellegen, & Bouchard, 1998](#)) has shown that task performance is distributed roughly normally in the population of the United States. We find the mean stage of performance in the U.S. to be Formal stage 11 (e.g., [Commons, 2008](#)). It is possible that the mean stage in some other educated countries may be slightly lower or higher than that found in the U.S.

It may be that societies are stratified according to stage of performance: The most highly paid people could be those with the highest stages of performance, and the lowest paid people could be those with the lowest stages of performance.

One reason for such stratification is that work at the lower stages has not been associated with increases in productivity. These positions require the least amount of education. Hence wages are stagnant. Still, systematic and meta-systematic performances are in short supply, and the demand is high for the services of individuals with such levels of performance. In earlier work, we have found that a preponderance of professionals or managers perform at the Systematic Stage 12 (Commons, Krause, Fayer, & Meaney, 1993). That study also found that top legislators, corporate or nonprofit leadership, top sales people, research professors, appellate judges, and those in similar professions will often perform at Metasystematic Stage 13. The purpose of the current study is to directly examine whether such stratification can be seen in real world economic behavior.

### Current Study

The current study investigates peddlers' pricing strategies, which is one aspect that may lead to income disparity. We are interested in two groups of people: (a) people who sell things on the sidewalks or in swap meets, flea markets, or fair-like environments (peddlers); and (b) People who transport goods (carters). Three quasi-independent variables were studied: (a) stage of the person's economic behavior, (b) what country they worked in, and (c) how much school they had completed.

Pricing strategy is how peddlers determine at what price their commodity should be sold. It is hypothesized that each increase in the stage of pricing increases the average marginal profit of the sales. For peddlers, pricing their goods in a way that makes enough of a profit that they can stay in business, and attracts customers as well, are both essential for the success of their businesses.

Deciding on an effective pricing strategy is not just one task. Instead, it is made up of at least two tasks that must be intercoordinated. How to price the goods is partially a social perspective taking task—understanding what price customers are willing to pay. Individual's success at taking another's social perspective when pricing their goods is affected by their developmental stage. As individuals solve social perspective taking tasks of increasing complexity, their stage of social perspective-taking can be said to increase. This can be seen as they move from taking the perspective

of only one individual to then finally taking the perspective of "people in general."

This task must also be coordinated with what one, as a peddler, would like to earn or what one must earn to stay in business. For example, a peddler may understand that the price must be higher than the cost. A peddler may sell at a variable price based on mutual agreement, as long as it is higher than the cost or to unload inventory. Or that peddler may sell based on a proportion mark up over the cost. The peddler who integrates such business considerations with taking the perspective of the customer may function at a higher stage and be more likely to earn higher income.

There are some interesting characteristics about the informal economic activities that are examined in the current study (Ross, 2005). Because these activities are part of the informal economy, the pricing is solely based on an informed consent process. The individuals being studied here were all largely independent operators or they contracted their services to individual customers or extremely small businesses. All transactions were in cash. The informal economy is a broad term that refers to that part of an economy that is not taxed, monitored by any form of government, or included in any gross national product (GNP), unlike the formal economy (Becker, 2004). Therefore, unlike individuals in the regular economy, these individuals had more control over the tasks that they took on in their peddling activities. Their behaviors are likely to be more reflective of their own reasoning processes, rather than imposed on them from the outside. There are much data on people who are employed in the regular economy and almost none for the gray and black (informal) economy who work for themselves. Studying informal economies across cultures allows us to test the stage of pricing strategies used by people of varying levels of education ranging from no schooling to completion of college, and at different stages of development ranging from primary operations to metasystematic.

### Method

#### Participants

Interviews of 51 peddlers and carters were conducted: 33 (64.7%) were from Rio de Janeiro (in the state of Rio de Janeiro) and Belo Horizonte (in the state of Minas Gerais), Brazil; 18 (35.3%) were from Richmond, California,

and Dorchester, Massachusetts. There were 35 (68.6%) who were male, and 14 (27.5%) who were female. The gender of two subjects was not recorded (3.9%). Participant ages ranged from 17 to 85 with  $M = 47.1$  ( $SD = 14.13$ ). Three carters were included within the Brazilian sample. This was primarily because the nature of their business was quite similar to that of the peddlers. They either procured items, some of which they might have to pay for, and then transported those items, or they sold their services directly as transporters of items for either individuals or businesses. The participant peddlers sold a variety of items, such as jewelry, clothes and accessories, kitchenware, posters, CDs and DVDs, wallets, key chains, and other small items that could be purchased and displayed on a cart, table, or other small display area. For the purpose of simplicity, we will refer to the participant peddlers and carters as just peddlers in the rest of the article.

### Procedure

Participants were approached by the interviewers as they were selling or transporting goods. There were no criteria on how the participants were chosen; if a participant was not otherwise busy and agreed to respond to questions, they were included. The interviewers informed the participants about the study and got their consent verbally. The interviews were conducted in the streets and the flea markets. In Brazil, the interviews were conducted in English which was translated question by question into Portuguese. The answers were translated back into English. In a few cases, one of the interviewers, who is also an author of this article, conducted the interview in Portuguese, whereas the other conducted the interview in English and was assisted by a native Brazilian translator. In the U.S., two of the authors conducted the interviews in English. The interviews were structured. Each interview lasted between five and eight minutes. Participants were asked questions about three categories: demographic information, health-related issues, and information about their businesses. In this article, only questions about their educational background and about their business are included. The questions concerning their business, and particularly their pricing strategy were "How do you set your prices?"; "How much do you earn in a

day/week/month?" (note, this was 3 separate questions); "Do you know what others charge?" and "Do you belong to an organization?" If an initial reply to a question did not engender complete enough information, open-ended follow up questions were used, as is customary in interviews. For Education, individuals were asked how much schooling they had, and their responses were put into 9 categories, including *no schooling* (= 1), *partial primary schooling* (= 2), *up to just before high school* (= 3), *partial high school* (= 4), *completed high school* (= 5), *some college or technical college* (= 6), *completed college* (= 7), *master's degree* (= 8), and *doctorate* (= 9).

### Results

The responses to the questions about how they priced their goods and services were scored by three of the authors according to the Model of Hierarchical Complexity Scoring Manual. Each example was discussed until all three agreed on the stage level for that example. The pricing strategies of different orders of Hierarchical Complexity are summarized below.

At the *Primary Stage 8*, peddlers did not control their prices: Either someone set the price for them, or they would take whatever someone offered. An answer at primary stage 7 was "My son sets the price." At the *Concrete Stage 9*, peddlers set their price by adding an amount to the price they paid, or by negotiating with each individual buyer. At the *Abstract Stage 10*, they set their prices based on social norms. They referred to what others were charging and they either matched or beat that price. They might also refer to a social norm as a justification for their prices. An example at the abstract stage 10 was "It is based on the prices of the others. It is the fair price."

At the *Formal Stage 11*, they set prices based on a proportional markup. They added a proportion of what they paid for the goods to the price. If the item did not sell at this proportion, they stopped buying the item to sell. Most people who employed this strategy used numerical percentages. One participant, however, had a formal concept of proportionality based on magnitude and estimation. An example at Formal Stage 11 is "I use percentage, according to each product." Percentages relate two variables

from the abstract stage, the difference between the price bought at and sold for, divided by the price bought at.

At the *Systematic Stage 12*, people used multiple factors to set prices. This often included having a marketing strategy. They understood how the markets they were selling in worked. They were especially good at dealing within the markets in which they acquired their goods. An example at Systematic Stage 12 is “This peddler sets his prices based on the price of the material that the coin is made of. Often it’s the price of silver. He also understands what coins are worth on the market, and knows how to buy them at a lower price and sell them at a higher price. They know that some people do not know what they are worth so he can also use that to make money.”

At the *Metasystematic Stage 13*, pricing strategies involved being able to compare and choose between different business models. The one metasystematic-performing participant, who ran a high-end jewelry business, did not sell his wares on the street. He traveled from city to city to sell to high-end stores. He had a complex business model and understood what niche of the jewelry industry his business was filling. At the Metasystematic Stage 13, this “peddler” knew his costs and the markup, as well as two other strategies; one was that he wanted to be in a niche, the mid- to high-end semicustom jewelry market (\$5,000 to \$6,000 per piece). He also didn’t want to sell too many of his products to keep them valuable; he didn’t want them becoming “mainstream” because then they would be cheaper.

### Descriptive Results on Education, Earnings, and Stage

Education was divided into categories, as shown in Table 2. Across both cultures the largest group was 3, or education from the 5th to 8th grade ( $n = 15$ ), consisting of 29.4% of the total sample. The other two large groups were 4 = *partial high school* ( $n = 11$ , 21.6%), and 2 = *1st to 4th grade* ( $n = 10$ , 19.4%). Figure 2 shows that the distributions of education within each of the two countries were centered around a different category. For Brazil, the largest group was 3 = *5th to 8th grade* ( $n = 11$ , 37.9%), and only a small number of participants had an education at the high school level or

Table 2  
*Percentage of Individuals in Education Categories for Entire Sample*

| Education category numbers | Education level        | Percentage of participant peddlers ( $n = 45$ ) |
|----------------------------|------------------------|---|
| 1                          | No School              | 3.9   |
| 2                          | 1st to 4th grade       | 19.6  |
| 3                          | 5th to 8th grade       | 29.4  |
| 4                          | High School            | 21.6  |
| 5                          | Some College           | 5.9   |
| 6                          | B.A.                   | 7.8   |
| 7                          | M.A. <sup>a</sup>      | 0   |
| 8                          | Doctorate <sup>a</sup> | 0   |

<sup>a</sup> Indicates that no subjects reported completing such level of education.

above ( $n = 6$ ). For the U.S., the largest group was 4 = *partial high school* ( $n = 6$ , 37.5%). An additional six individuals had either some college or had completed college.

In a second preliminary analysis, each peddler’s estimated earnings were categorized based on the power function,  $4^m$  ( $m = 1, 2, 3, \dots$ ) as shown in Table 3. The reason this was done this way is that the logarithm of earnings is a linear scale. The power of 4 was chosen because many people in Brazil earned less than 4 dollars a day. Note that the Brazilian Real was converted into U.S. Dollars for these comparisons. At the time this was done the Real and the Dollar were very close in value. Also, results are done in terms of dollars/day because (rather than week or month) as this category allowed the incorporation of all of the respondents. As seen in Table 3, for the sample as a whole, the largest income group was 4 = *64–256 \$/day* ( $n = 14$ , 27.5%). The next two largest groups were 3 = *16–64 \$/day* ( $n = 11$ , 21.6%) and 2 = *4–16 \$/day* ( $n = 11$ , 21.6%). A comparison of earnings among peddlers in the Brazil versus the United States, in the rightmost two columns, shows that individuals in Brazil were more likely to be earning less money than those in the United States.

The third variable that we examined in this descriptive fashion was the Stage of Pricing. For the sample as a whole, this ranged from Primary Stage 8 to Metasystematic Stage 13 ( $M = 10.25$ ,  $SD = 1.14$ ). For Brazilians the mean stage was 10.09 ( $SD = 0.81$ ). For the U.S., mean stage was 10.56 ( $SD = 1.25$ ). The mean difference in stage

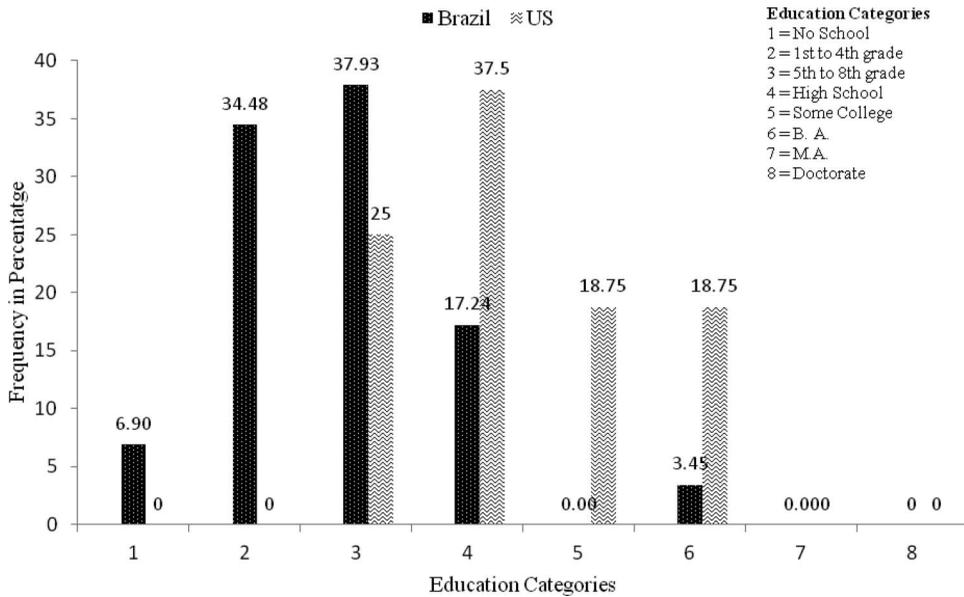


Figure 2. Frequency distribution of peddler education category by country in percentage.

across the two cultures was not statistically significant. Figure 3 shows the frequency distribution of stage by country in percentages.

**Relationships Among Variables:  
Correlations and Regression Analyses**

The correlations between Stage, Country, Education, and Earnings were calculated. Results are shown in Table 4. Stage alone was significantly correlated with Earnings, as were both Country and Education. Country and Education were also significantly correlated with each other. The correlations between Stage and Country, and Stage and Education were not significant.

The purpose of the study was to see whether Stage of pricing would predict Earnings. We

wanted to predict Earnings while controlling for other factors, such as Country and Education. Although both Country and Education were significantly related to Earnings, they were also significantly related to each other. They would be a source of multicollinearity in the regression analysis. It made more sense just to use Country, especially because there were differences in Education level in the two countries and country would take that into account. Stage and Country together predicted Earnings with an  $R = 0.705$ ,  $F(1, 44) = 20.78$ ,  $p = .0001$ , accounting for 49.7% of the variance in Earnings. Both factors were significant. For Stage  $\beta = 0.408$ ,  $p = .001$ , and for Country:  $\beta = .501$ ,  $p = .0005$ . Adding Education to the regression analysis increased the

Table 3  
Percentage of Individuals in Earnings Categories for the Entire Sample

| Earning categories | Earning per day in U.S. dollars | Percentage of participant peddlers (n = 45) | Percentage of participant peddlers from the U.S. (n = 15) | Percentage of participant peddlers from Brazil (n = 30) |
|--------------------|---------------------------------|---|---|---|
| 1                  | 0-4                             | 3   | 0   | 9.1   |
| 2                  | 4-16                            | 21.6  | 0   | 33.3  |
| 3                  | 16-64                           | 21.6  | 5.6   | 30.3  |
| 4                  | 64-256                          | 27.5  | 55.6  | 12.1  |
| 5                  | 256-1024                        | 9.8   | 22.2  | 3   |
| 6                  | >1024                           | 0.2   | 0   | 3   |

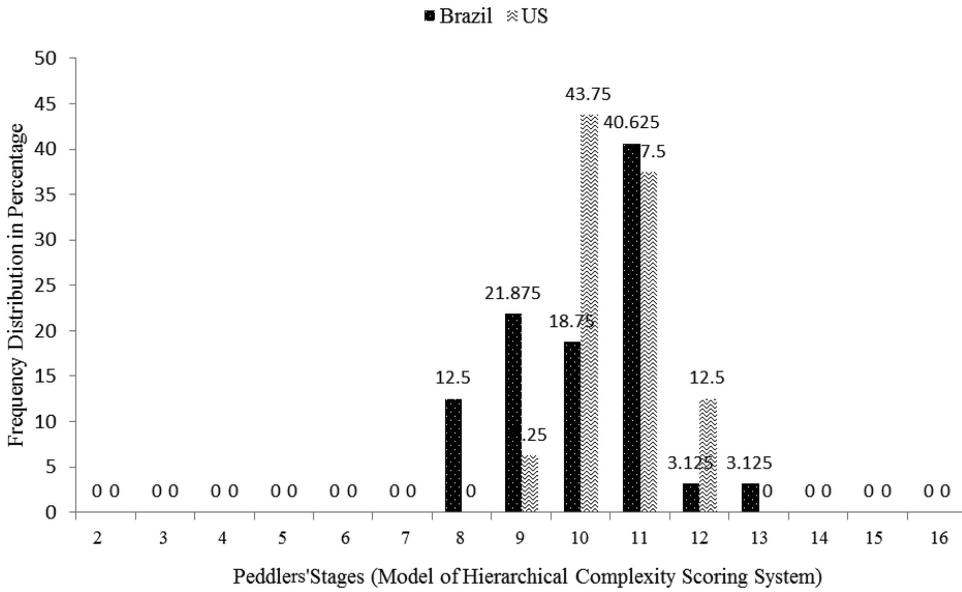


Figure 3. Frequency distribution of peddlers' stages of the Model of Hierarchical Complexity by country in percentage.

R slightly to 0.738,  $F(1, 40) = 14.751, p = .0001$ , accounting for 54.5% of the variance, an insignificant increase of 4.8%. In the equation with the three terms in it, Education contributed  $\beta = .270$  to the income earned, which was not significant ( $p < .057$ ).

**Discussion**

The study found that peddlers' stage of pricing strategy, along with the country in which

they were running their business, significantly predicted their reported earnings. Stage, by itself, contributed .408 to an individual's earnings. Being from Brazil versus the U.S. contributed slightly more, but this is to be expected given the differences in the economies of Brazil and the United States. Education, examined in a second regression analysis along with the other two variables contributed .254, which is just under half the contribution of stage and was also nonsignificant.

Table 4  
Correlation Between Stage, Country, and Education With Earnings Category

|                    | Stage | Country | Education | Earnings category |
|--------------------|-------|---------|-----------|-------------------|
| Stage <i>r</i>     | 1     | .196    | .258      | .506**            |
| Sig. (2-tailed)    |       | .182    | .091      | .000              |
| <i>n</i>           | 48    | 48      | 44        | 45                |
| Country <i>r</i>   |       | 1       | .575**    | .581**            |
| Sig. (2-tailed)    |       |         | .000      | .000              |
| <i>n</i>           |       | 51      | 45        | 45                |
| Education <i>r</i> |       |         | 1         | .568**            |
| Sig. (2-tailed)    |       |         |           | .000              |
| <i>n</i>           |       |         | 45        | 41                |

Note. In the analysis, Brazil = 1, and United States = 2.  
\*\* Correlation is significant at the 0.01 level (2-tailed).

These findings are especially relevant as they pertain to the hierarchical complexity of the strategy that a peddler would use when setting their prices. Because income is one of the major factors that is associated with social stratification, this suggests that stage of reasoning may be associated with outcomes that vary in fairness. It should be noted that the mean stage for peddlers in both Brazil ( $M = 10.09$ ) and the US ( $M = 10.56$ ) was lower than Formal Stage 11. This is one stage lower than what we consistently find in U.S. online samples (e.g., Commons et al., 2008). The restriction in the range of possible stage scores would tend to attenuate any correlations found. That is, if the study had been conducted with a wider range of jobs, with more higher-stage individuals, it is possible that these relationships would have been even stronger.

Second, country by itself was also related to a difference in income. The significant correlation between Country and Earnings may be due to differences in purchasing power. Income measures were all calculated in terms of US dollars. However, purchasing power, or the amount of goods and services purchased by the money in the local economy, differs in the U.S. and Brazil. In further research, income should be adjusted for purchasing power.

This study also found that there was a significant correlation between country and education. The results on education level in the two cultures clearly showed that it was more likely for participants from the United States to have obtained a higher level of education than for participants from Brazil. Nevertheless, participants' overall stage of pricing strategy was not significantly related to the country in which they were living. Education also was not significantly related to stage of pricing in this sample.

This may be, and most likely is, the first study showing a stage effect in behavioral economics. In traditional "behavioral economic" models of decision making (e.g., Rachlin, 1995), it is assumed that decision makers are all equally competent in terms of their understanding of economic information. The current study would suggest that including a measure of developmental stage might sharpen the understanding of the kinds of economic decisions made by both humans and animals.

Thus far, this study was conducted in only two cultures. Nevertheless, the  $R$  value (of

0.705 when using the two predictor variables country and stage) was large. Similar stages and also similar effects on income may be predicted across other cultures.

Should the results of this study be confirmed in other settings, this study could have identified another process or factor that may lead to unfairness and inequality, and that is developmental stage of reasoning about pricing strategies (and possibly other economic issues). Similar to the moral imperative for societies to provide equal access to education, it would also seem imperative for societies to provide opportunities for stage change. Individuals are not directly responsible for what stage they perform at. Because it was found that education and stage of reasoning were not related in these samples, it may be particularly important to provide different kinds of educational experiences that would lead more directly to stage change. How this might be done is discussed next.

Increasing the developmental stages of individuals might be a good way to decrease social stratification, as suggested by these results. Research in studies from different traditions has shown that developmental stages of people can usually be increased by one to one and a half stages, at least over the relatively short run. Note that a one stage increase in a model such as the Hierarchical Complexity Model is equivalent to a half-stage change in other models such as traditional moral developmental ones (Schlaefli, Rest, & Thoma, 1985; Tuladhar & Commons, 2014). In a study done by Power, Higgins and Kohlberg (1989), stage change in moral judgment was studied using the Just Moral Approach. In a reanalysis of those data, Tuladhar and Commons regressed the number of years of intervention on stage change in the subjects from the Cluster school (Power, Higgins, & Kohlberg, 1989). Years of intervention significantly accounted for only 11% of the change in stage ( $R^2 = 0.11$ ,  $p = .001$ ). The maximum change of stage from the first year (before intervention) to fourth year (after intervention) was 100 MMS, which is equivalent to one stage. The minimum change of stage was 0 MMS indicating no change in stage after intervention. The mean stage change was 50 MMS ( $SD = 36.004$ ), which is half a stage. This study showed that stages cannot be raised by a lot even after intervention. In a different kind of intervention, in which students were placed on

teams and the teams earned points toward outcomes that they chose, Grotzer, Commons, and Davidson (1986) raised the stage of performance from concrete to formal in 75% of 5th and 6th graders, a two-stage change on average in the Model of Hierarchical Complexity. In a follow-up study, such performance did not generalize until the 7th grade. Of course, both of the interventions discussed were relatively short-term.

It makes sense that change in stage is relatively difficult to bring about, and that over a short period of time a change of at most one stage seems the most one can expect. After all, development without any specific intervention does not proceed at a rapid pace. It also seems possible that a more adequate job of bringing about stage change than is currently found might occur. This would include (a) specific stage-change interventions, (b) instruction that is more individualized as to where the person is performing successfully, and (c) and material and or techniques to keep a larger proportion of learners very highly involved. This should be done at all levels of education, from the primary level through at least college.

In future studies, it may also be beneficial to study other forms of reasoning, including peddlers' social perspective taking skills and moral reasoning. For peddlers, understanding of the perspective of consumers, in particular, could be beneficial for their business. It may be fruitful to investigate the relationship between their stage of social perspective taking, pricing strategy, and earnings. A more long-term goal would be to extend the study to people who are employed in the formal economy, to examine such questions as to the stage of reasoning of people who work at different levels within organizations.

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