“Big Fish in a Small Pond”: Chinese Migrant Shopkeepers in South Africa

Edwin Lin
University of California, Berkeley

The steady growth of Chinese migrants to South Africa in the past decade provides an opportunity to use Sen’s (2001, Development as Freedom. Oxford: Oxford University Press) capabilities approach in the field of immigration. This theoretical framing reveals that the Chinese employ, what I call, a small pond migration strategy – utilizing mobility to maximize their social, economic, and human capital. I argue that the Chinese move to South Africa because of a desire to venture out of China and pursue freedoms associated with being one’s own boss. Once in South Africa, they choose to stay because of comfortable weather and a slower pace of life, despite losing freedoms associated with high crime in Johannesburg. The findings suggest alternative ways of understanding factors of migration as well as a model that explains migration from more developed countries to less developed ones.

INTRODUCTION

If you have not experienced crime or being robbed in South Africa yet, then you haven’t really (zhèn zhèn de) lived here! We all accept that this will happen to us eventually.

No, money is not good to make here (bù hǎo zhuan). Look around. It is so quiet, and it is like this most of the day. How can we make money? Some months, when it is really bad, we even lose money!

These quotes from recent Chinese migrant shop-keepers in Johannesburg, South Africa represent common responses I received when asking about their daily lives, interactions with South African society, and economic situations. In 2009, estimates of the Chinese population in Africa sat between 580,000 and 820,000. Three years later, that estimate has increased to over one million, South Africa being the largest recipient of
Chinese migrants with approximately 350,000 Chinese in 2009, and at least 500,000 in mid-year 2011 (Statistics South Africa, 2011). The most recent Chinese migrants are mostly low-educated peasants and unskilled laborers who come from mainland China to engage in small-scale shopkeeping. Given China’s growing economy, the physical distance between China and South Africa, the striking ethnic differences between Chinese migrants and the majority of South African citizens, as well as self-expressed difficulties Chinese people face while living in South Africa, why have Chinese people increasingly moved away from a rising world power to this poorer and less developed country, and why have they decided to remain in South Africa upon arrival? In other words, what factors go into the decision-making process of Chinese migrants in South Africa, and what meanings do they ascribe to their mobility decisions?

Standard explanations for migration give us some purchase on these two questions. Economic incentives (Hatten and Williamson, 1998; Massey et al., 1998) in a globalized world economy (Sassen, 1988, 1998a,b) are important, as are established social networks that perpetuate migration (Massey, 1990; Menjivar, 2000). Politically and legally, relative low barriers to entry also help to explain why Chinese migrants choose South Africa instead of a country in the global north (Massey, 1999a,b; Zolberg, 1999). More recent research goes beyond the initial move from home country to destination country often using a quantitative approach to represent the migration decision-making process. These studies consider the economic investment involved in migration (Khwaja, 2002), the social networks and capital in both the place of residence and the place of destination (Alberts and Hazen, 2005; Haug, 2008), and the value of immobility (Fischer, Martin, and Straubhaar, 1997) as important factors in explaining a migrant’s decision-making process. While these factors are helpful in examining the case of Chinese migrants in South Africa, they fail to capture the rhetorical strategies and meanings that Chinese migrants construct concerning their migration to and settlement in South Africa.

The present study applies Sen’s (2001) capabilities approach to the field of international migration as a framework to uncover the rhetorical strategies and meanings Chinese migrants ascribe to their migration experience. This framework gives focus to the perspective of migrants concerning their use of mobility as a tool to improve their lives. It contributes to existing research in two ways: first, the framework acts as a way to bridge the gap between south–south and south–north immigration research, where currently each subfield sees its phenomena as distinct and separate
from one another with little overlap or cross-conversation; and second, it provides an alternative to using aggregate national statistical data as the primary way to analyze and explain motivational factors of migration.

Based on in-depth interviews and participant observation in Johannesburg, I find that in addition to those factors isolated by traditional theories of migration, recent Chinese immigrants decide to come to South Africa to gain life experience (adventuring outside of China) and to seek out the possibility of attaining self-employment (becoming their own boss). Results reveal that the Chinese migrants who choose to stay in South Africa do so because they want to continue to pursue their dream of self-employment and because they experience a more comfortable life due to a slower paced living, better weather, and a cleaner environment. These less tangible factors are important freedoms and capabilities that not only help explain the migration pattern between China and South Africa, but also serve to make more complete existing migration theory. Although the conditions in South Africa, especially well-documented problems with crime (SAPS Strategic Management, 2013), lead to Chinese migrants forfeiting certain freedoms (such as going out at night), results show that migrants adapt and adjust, and those who remain choose the possibility of saving up money and becoming one’s own boss over the freedoms they forfeit. In the end, while existing literature provides statistically generalizable data on social and economic factors that affect migrant decision-making, the case of Chinese migrants in South Africa reveals an additional factor: the migrant’s own understanding of his or her mobility as a strategy for improving his or her life. Migrants are people with individual agency and to thoroughly explain their behavior in choosing one living space over another, one must account for the stories they tell about how and why they made their decision. In the specific case of Chinese migrants in South Africa, migrants knowingly and deliberately search out poorer towns and regions so that they can take advantage of more favorable economic situations and maximize their social, economic, and human capital. I refer to this migration strategy as ‘small pond migration,’ based upon the American idiom, “big fish in a small pond.”

**BACKGROUND**

In the past decade, Chinese migration has grown quickly to become increasingly commonplace all throughout China. According to the most recent data, internal migration primarily to coastal provinces has exploded to the
point where China has a third of all internal migrants in the world, and the number of rural Chinese migrants working away from home has reached 160 million or 12 percent of the country’s population (Chan, 2012). This growing floating Chinese population has translated to overseas migration as well. While Chinese emigration to Southeast Asia has slowed, destinations such as Europe and Africa are experiencing significant increases in Chinese immigration (Skeldon, 2011). In the case of Europe, Chinese emigrants are less skilled than those going to older and more traditional destination regions such as North America or Australasia. These immigrants work in the European trade or manufacturing sector (Skeldon, 2011). With China becoming Africa’s leading trade partner, Chinese immigration to the continent has also increased (Politzer, 2008). Estimates of Chinese in Africa range from 580,000 to over 800,000 with the overwhelming majority of Chinese found in South Africa (Park, 2009a,b). Chinese immigrants to Africa can be divided into four categories: temporary labor migration linked to Chinese development and investment in Africa, small-time entrepreneurs, in-transit migrants, and agricultural workers (Politzer, 2008). The largest group of Chinese immigrants in Africa is made up of temporary labor migrants who utilize private employment agencies who provide migrants with proper visa and travel documents to work in construction or other manual labor (Park, 2009a,b).

While Chinese labor migration is a major trend in recent Chinese emigration around the world, Africa is seeing an increase in its second largest group of Chinese immigrants: small-time entrepreneurs. These migrants were not entrepreneurs in China, but upon migrating, began engaging in entrepreneurial activity. ‘China shops’ import cheap but quality Chinese goods and sell them to the local population – everything from clothing to travel accessories, from everyday household appliances to toys and games for children (Park, 2009a,b). The establishment of these Chinese shops in Africa has snowballed creating more demand for Chinese immigrant labor because shop owners prefer to trust their business with family and friend networks rather than local labor (Østbø and Carling, 2005; Ma Mung, 2008).

South Africa has had several waves of Chinese immigrants throughout its history, waves which can be broken down into three groups: Chinese South Africans whose families came as early as 1900 (approximately 10,000), Taiwanese South Africans who set up businesses in the 1970s and 80s (approximately 6,000), and new Chinese migrants who came from the People’s Republic of China since the 1990s (over 500,000; Park,
This paper focuses on the largest group of Chinese South African immigrants—the mainland immigrants who have arrived in the past two decades. This group is predominantly formed by small-scale entrepreneurs from mainland China who set up Chinese shops importing Chinese-made goods (Huynh, Park, and Chen, 2010).

Of the most recent group of migrants, the majority live in Johannesburg, an economic hub for all of southern Africa. Due to the rapidly increasing saturation of Chinese shopkeepers in Johannesburg, however, this third wave has begun to move out to more rural areas and neighboring provinces (Park, 2009a,b). Chinese small-scale entrepreneurs can be further subdivided into three categories: the first-movers who emigrated in the early 1990s, immigrants who came during the mid- to late-1990s from business connections with Taiwanese factories, and traders and peasants who started moving in the late-1990s and are now increasingly coming from all over China (Park, 2009a,b). The first-movers have had large success in establishing wholesale businesses and importing goods from China. Large wholesale businesses are mostly found in Johannesburg, which has over ten Chinese wholesale centers with hundreds of Chinese wholesale stalls (Park, 2009a,b), but new wholesale distribution centers have recently opened in both Cape Town and Durban, two major coastal cities in South Africa, as well as Bloemfontein, located in the rural center of South Africa. Many of these first-mover entrepreneurs have either returned to China or migrated to more developed countries, employing a step-wise migration strategy (Paul, 2011). Immigrants in the second group from the 1990s have built extensive business networks and have become involved in industries such as mining, manufacturing, and property development, as well as expanding wholesale and importing to neighboring countries in southern Africa (Park, 2009a,b). The final group of ongoing migrants is the largest and has spread throughout South Africa, searching for holes in the retail and wholesale market where their small shops can survive (Park, 2009a,b). Many of these migrants come to South Africa through family and friends who sponsor them and provide work visas for their stay in South Africa. This paper focuses on this last and largest group of ongoing Chinese migrants to South Africa.

THEORETICAL FRAMING

Current theories of migration act as a starting point for framing the case of Chinese migration to South Africa. Existing models focus on three sets of factors: economic, social, and political. Economic models focus on
individuals and wages (Hatten and Williamson, 1998), household risk minimization (Massey et al., 1998), entrepreneurship (Waldinger et al., 1990), economic investment in the act of migration (Khwaja, 2002), and a bifurcated labor market (Sassen, 1998a,b). Sassen, in particular, provides a political–economic model that emphasizes capital venture flows and historical connections (Sassen, 1988, 1998a,b). Social models pay special attention to social capital and social ties (Menjivar, 2000), social networks in the country of origin and country of destination (Alberts and Hazen, 2005; Haug, 2008), and how networks snowball and accelerate migration flows (Massey, 1999a,b). Finally, political and legal constraints can channel migration by making some destinations more difficult or easier to enter than others, influencing the countries’ migrants target (Massey, 1999a,b; Zolberg, 1999; Torpey, 2000). These migration models provide a strong foundation for knowing what factors to test when attempting to explain existing migration patterns. A limitation of existing theories of migration, however, is the relative absence of the measures of migrants’ understanding of their migration decisions, plans, and experience. In this paper, I argue that additional information concerning how migrants interpret and understand their experience will increase the analytic power of perspectives on international migration.

Of all existing frameworks, social network theory provides the most purchase on explaining Chinese South African migration because of its attention to the importance of social ties. Social network analysis focuses on seeing people as nodal points connected to one another and analyzing the effects of these relationships (Scott, 2013). In the field of immigration, this has taken the form of research on social ties, social capital, and social embeddedness (Portes and Sensenbrenner, 1993; Menjivar, 2000). Social networks decrease the barriers to entry and the costs of migration for new immigrants arriving in the destination country. When it comes to entrepreneurship, social networks help migrants start businesses by lowering the entry barriers for small-scale entrepreneurs (Waldinger et al., 1990). While this paper does not use a network analysis of Chinese immigrants in South Africa, it does draw on the importance of social ties in helping Chinese migrants have an easier time migrating to South Africa and establishing their small businesses. As suggested above, however, social network theory is limited in its emphasis on the perspective of migrants and how migrants understand and ascribe meaning to their decision to migrate. This perspective sheds light on why Chinese migrants chose specifically
Much South to south migration research focuses on instances of forced migration, wage labor migration, and seasonal labor migration (see for example Yang, 2003; Ratha and Shaw, 2007a,b; Bakewell, 2009; Rimmer, 2009), but Chinese migration to South Africa is none of these. In general, three of the largest factors found to determine south–south migration are proximity, social networks, and income (Ratha and Shaw, 2007a, b). With proximity, while 80 percent of all south–south migration happens between countries that share a border (Ratha and Shaw, 2007a,b), China is nearly halfway around the world from South Africa, resulting in presumably higher migration costs than migration between bordering countries. Available data indicates that excluding cases related to the breakup of the Soviet Union, only 19 percent of south to south migrants move from a country with higher overall income to a country with lower income, an indeterminate portion of these migrants being refugees and asylum seekers (Ratha and Shaw, 2007a,b). The movement from China to South Africa falls within this 19 percent.

Sen’s, 1993 capabilities approach for development, when applied to migration theory, provides a useful framework for understanding the case of Chinese migrants in South Africa, as well as migrants’ decision-making process in general. In his book Development as Freedom, Sen (2001) shows that the end goal of development has always been increasing the individual’s capability to live a better life. Development should not be confined to national projects enhancing infrastructure or employing fiscal and monetary policies to generate higher gross national product. Instead, development should be defined to include any action where the end goal is to increase the capabilities, freedoms, and choices that individuals have to live the way they want to live. In other words, Sen provides an alternative view that sees increasing political freedoms, economic facilities, and social opportunities all as important parts of development, a process which is situated in individuals’ ability to pursue better lives (Sen, 2001:36–40).

Sen defines these capabilities as “a kind of freedom: the substantive freedom to achieve…various lifestyles” (Sen, 2001:75). A capability set, then, is all the choices and potential life trajectories from which an individual can choose, and Sen’s capabilities approach seeks to evaluate not only what life path the individual takes but also what potential options the individual has open to him or her. Sen also recognizes that in many cases development projects may empirically result in increasing one set of
capabilities at the expense of another (i.e., suspending rights to promote a transition to capitalism); however, he contends that, in theory and ideally, all capabilities can increase together, making democratic and education-based development the most ideal development path. Applying this development approach to immigration means holding two key tenets as foundational to understanding international migration: (1) migrants move primarily to improve their capabilities sets (migration as a strategy to increase freedoms); and (2) mobility is one of the best and most effective ways to quickly and fundamentally change one’s capability sets (mobility as a development strategy).

This analytic approach provides a more fruitful theoretical frame for understanding migration patterns by pushing migration theory beyond economistic explanatory factors and toward a narrative approach that understands the migrant’s experience as a journey of increasing one’s freedoms. Explanatory factors for migration are complex and multiple, almost always including some level of trade off, where the migrant loses some capabilities to gain others. Narrative data complement more objective-based approaches to explain motivations for migration by identifying more clearly which freedoms migrants seek to increase through migration.

One of the problems with a narrative approach, especially when the person is speaking about oneself, is that the data are inherently subjective. While this might be considered a weakness in measurement within the narrative framework, it is, at the same time, its strength: narratives are our access point to the rhetorical strategies and meanings that the migrants themselves attach to their mobility. Because migrant narratives are inevitably told after the fact, it is always possible that the reports are altered because of memory and the passage of time. But this does not undercut the importance of narrative data revealing factors of migration, since migrants’ evolving understanding of their own migration experiences influences their future decisions regarding mobility (Roth, 1989; Richardson, 1990; Vandsemb, 1995; Czarniawska, 2004).

The approach I outline here builds on complementary arguments about capabilities in subfields that focus on small-scale migrant entrepreneurship, ethnic enclaves, and remittances, as well as scholarship documenting more deliberate mobility strategies. For example, when explaining Filipino migration to the Gulf States and Singapore, Paul (2011) elaborates on the idea of stepwise migration, where migrants move to stepping stone countries as a way to accrue capital with the ultimate goal of moving to countries in the developed world. This serves as one
example of how migrants utilize mobility strategically to improve their capabilities. Unlike the Filipinos that Paul studied, however, Chinese migrants to South Africa do not use a stepwise migration strategy, but instead employ almost the opposite, what I call a “small pond” migration strategy.

The American idiom, “A big fish in a small pond,” is used to describe a person who is important only because he or she is situated in a small sphere of influence. If one were to take this “big fish” and place it in the ocean, it would cease to have much importance, because it is not really that big a fish, and the ocean is vast. To take the idiom in the opposite direction, if a medium-sized fish in a large pond moves to a smaller pond, it will no longer have to compete with the bigger fish from its original pond and now has the chance of becoming the biggest fish around. If someone wants to become a “big fish,” he or she doesn’t actually have to grow bigger; he or she can just move to a smaller pond.

The small pond migration strategy is where migrants move from a more developed place to a lesser developed country or region to take advantage of characteristics of the receiving place, which effectively increase their existing social, economic, and human capital. Through the use of small pond migration, Chinese migrants who move to South Africa experience an almost immediate increase in the utility of their capital, which translates into more freedoms. Unlike stepwise migration (Paul, 2011), where the migrant focuses on moving to a more developed place, in small pond migration, migrants focus on advancing their socioeconomic status, moving to areas where they can maximize the effectiveness of their existing capital. When Chinese migrants explain their choice to move, the fact that South Africa is less developed is the very reason for wanting to go there. This way of thinking is exhibited in a Chinese proverb that parallels the “big fish in a small pond” idiom: *shan zhong wu lao hu, hou zi cheng da wang*. This proverb means, “In a mountain with no tigers, the monkey becomes king.” While the English idiom holds a derogatory connotation that a big fish in a small pond is still unimportant, the Chinese proverb has the opposite connotation and praises the monkey for taking advantage of the mountain’s lack of tigers.

Using a capabilities approach to understand a migrant’s decision-making process reveals that Chinese migrants in South Africa employ a small pond migration strategy which helps explain both why they come to South Africa and why, for those who stay, they choose to remain in South Africa. Traditional and quantitative approaches are simply unable to
account for the importance and effect of such a mentality. Therefore, while social network theories, economic frameworks, and decision-making models provide the groundwork for understanding why Chinese migrate to and choose to remain in South Africa, I argue that, on examining the individual’s own narrative about the freedoms they gain from moving, an additional and important factor that helps explain the peculiarities of this case is revealed.

**METHOD**

To understand the narrative of Chinese migrants in South Africa, I spent a total of 6 months in South Africa conducting in-depth interviews and participant observation in three major cities: Johannesburg, Durban, and Bloemfontein. These locations were selected for their diversity and representativeness of the various Chinese communities in South Africa. Johannesburg has the largest Chinese population in South Africa with a well-developed Chinese retail and wholesale sector (Park, 2008). Durban has recently expanded in its Chinese retail and wholesale centers serving the southeast regions of South Africa. Finally, Bloemfontein is a major rural hub for the South Africa heartland where Taiwanese and Chinese migrants who do business in Lesotho reside. Prior to this 6-month research endeavor, five summer trips were made spread out across 7 years (since 2006) to work with the Chinese community in South Africa. These trips included academic projects, such as working with the University of Witwatersrand as a research intern, and more informal interactions, such as working with Chinese missionaries and churches, while learning about the Chinese community through immersion and regular interaction. While this paper does not explicitly draw on these experiences, the research does utilize previously established relationships with the Chinese in South Africa to gain access to the community. Rather than starting from scratch, I was able to quickly immerse myself in the Chinese shopkeeping community and so take advantage of a full 6 months of research.

This article primarily focuses on data from 3 months spent in Johannesburg. Most of the respondents from the other two field sites, Durban and Bloemfontein, were from a province in southeast China (Fujian Province) and have a distinct community and culture often separate from other Chinese migrants in South Africa. As a result, they ascribed different meanings to their mobility than the other mainland Chinese migrants in Johannesburg. Because of limited space, I focus on
this latter group who has increasingly moved to Johannesburg over the last decade to participate in the vibrant retail and wholesale market. Twenty four formal in-depth interviews were conducted while spending several hours a day at six different Chinese retail/wholesale malls across the city, casually talking and interacting with Chinese shopkeepers. In two other cities, Durban and Bloemfontein, an additional 18 in-depth interviews were gathered and several hours a week were spent conducting participant observation in Chinese malls and Chinese churches. Although the interviews and observations drawn on for this paper come from Johannesburg, data from Durban and Bloemfontein generally supported the findings discussed here. I choose not to rely heavily on data from Durban and Bloemfontein because I am unable to discuss the nuances and differences between these cities in the limited space provided.

Through the use of in-depth interviewing and participant observation, a deep narrative of the lives of Chinese migrants was obtained and insight into their perspective on their life decisions became clear, especially those regarding migration. Interviews were conducted with people from the most recent group of Chinese immigrants, as defined by Park (2009a, b), those who have arrived in South Africa over the last decade with the goal of becoming self-employed small-scale shopkeepers. I chose to focus on recent Chinese shopkeepers because they represent the largest growing group of Chinese people in South Africa.

The city and suburbs of Johannesburg are the largest receiving area of incoming Chinese migrants to South Africa. With two Chinatowns, Johannesburg’s Chinese communities are the most established in terms of history, growth, and social connections. The city itself is a major business hub for the entire region of southern Africa, making it an ideal place to conduct wholesale businesses. Many of the earlier arriving Chinese migrants set up successful wholesale businesses in Johannesburg. The more recent migrants go to Johannesburg in part because they have social connections with these earlier arrivers. Because the more recent arriving Chinese are unable to set up equally successful wholesale businesses, most have gone into retail shops that also provide for some smaller and more local wholesale customers.

Before locating sites for in-depth interviewing and participant observation, a geographical profile of the city was created, identifying key Chinese shopping areas, living spaces, and social communities. This was done not only as a way to understand the Chinese community in Johannesburg, but also as a way to ensure that the research covered the diversity of
different Chinese migrants in Johannesburg. Because Chinese migrants have different experiences depending on when they arrived in South Africa and from what parts of China they came from, shopping centers chosen for research needed to be diverse (from upscale to rundown and from newly opened to well-established), increasing the odds of interacting with different Chinese migrants arriving in South Africa at different times from different places. Ultimately, twelve shopping areas were identified. These shopping areas came in many forms including massive warehouses, where each storeroom was converted into a wholesale shop; local indoor shopping malls redeveloped to showcase at least 70 percent Chinese-owned shops, indoor flea market-like malls with anywhere from two- to four hundred stalls, and a new Chinatown which consisted of one street spanning five large blocks with street vendors, outdoor markets, indoor restaurants and entertainment, an assortment of small convenience stores, and other service shops, like hair salons and doctor’s offices.

Once these Chinese communities were identified, I started spending time in each of these locations and speaking informally to some Chinese shopkeepers to develop a profile of each area, including the extent of wholesale versus retail shops, the year the place first opened, and an estimate of the amount of business that came through. Five Chinese malls were selected covering the full range of different Chinese shopping spaces, especially in terms of length of time opened, size of the mall, and amount of customer traffic. This was done to ensure that the research would not result in bias where all the respondents were only representative of a subgroup of Chinese shopkeepers (such as only those who arrived early and were successful or only those who arrived recently and have struggled). Variation in Chinese shopping scene was sought to obtain a broad representation over the entire Chinese shop-keeping population in Johannesburg.

To maximize representativeness and minimize selection bias, shops in each shopping center were randomly sampled using stall numbers and a random number generator. I conducted interviews in the morning, when the stalls first opened and customer traffic was still low, to maximize my response rate. All interviews were conducted in Mandarin, and most were recorded. ¹ I, being of Chinese heritage, many shopkeepers were open

¹Of the 24 interviewees, six respondents requested not to be recorded. Interviews were on average 35 min and conducted while the respondents were watching their shops. Because these interviews were done in the morning, there were few interruptions.
toward me, and because I also conducted participant observation in the
Chinese malls, other shopkeepers noticed me talking with their neighbors
and so felt comfortable engaging with me in an in-depth interview. Over
two-thirds of all migrants asked for an interview agreed to participate in
some capacity. Because some conversations were interrupted and did not
last long (<15 min), they were excluded from the final total of 24 in-
depth interviews. In accordance with a narrative approach that seeks to
understand the thought process behind migrants’ decision-making, inter-
view questions focused on encouraging respondents to tell stories about
their experience of life in China, their decision to move to South Africa,
and their experience of South Africa so far. This would help get at the
salient issues for Chinese migrants and as to why they chose to migrate,
without explicitly asking the question.

In addition to asking migrants to compare their lives before and
after migration, interviews explicitly asked them to evaluate different capa-
bilities and freedoms to see whether any of them added value to their
migration experience. Based on Sen’s capabilities approach (2001) and the
way it has been operationalized in past research (Nussbaum, 2000; Sen,
2005; Klasen, 2006; Anand, Santos, and Smith, 2009), I asked about
their daily work environment, their social life, their interactions with
migrants and local South Africans, their knowledge and experience of
political freedoms, their health and access to health services, their access
to any government services, and their experience of gender or racial dis-
 crimination. Interviews also asked open-ended questions about the best
and worst parts of living in South Africa and living in China. This
allowed respondents to talk more about whatever they felt was most
important in their decision-making process and provided a space for the
respondents to verbalize any other capabilities that my questions may not
have brought up. Finally, interviews covered migrants’ future plans –
whether they planned to move back to China, stay in South Africa, or
move somewhere else. This was to further interrogate their way of under-
standing mobility and how they employed it as a tool to improve their
lives. I would sometimes revisit interviewees and have follow-up conversa-
tions with them, although these conversations were not recorded.

Of the 24 interviewees, ten arrived in South Africa within the last
3 years, seven arrived between 3 and 8 years ago, and seven respondents
have been in South Africa for more than 8 years. Twelve males and 12
females were interviewed ranging in age from 19 to 55, with four respon-
dents between 19 and 29, eight respondents in their 30s, nine respondents
in their 40s, and three respondents over 50. Twelve interviewees had some high school or only middle school education, nine interviewees had completed high school, and three interviewees had some form of higher education, either a university degree or attended technical school. All but two of my respondents came from coastal provinces in China. These provinces were fairly evenly distributed all along the eastern coast of China, from Liaoning in the north, to Guangdong in the south. Table 1 summarizes the social demographic information of Johannesburg respondents.

Interview data was analyzed not only in terms of the respondents and their characteristics, but more importantly, in terms of their responses to the key questions discussed above. After translating all the interviews, each interview was reviewed and coded so that each respondent’s answer to key questions could be categorized and sorted. Once all the interviews were coded, I looked for patterns among the responses to key questions to see how often respondents brought up certain themes. I then went back to read through the interview transcripts to get a sense at the nuances of these patterned responses. Although the stories of each respondent were different, the experiences and salient issues for Chinese migrants were similar. Quotes selected in this article were based on commonly held patterns that emerged from the interview data based on the approach to analysis described above.

The participant observation portion of my research design focused on understanding not only the way migrants conducted business in South Africa, but also Chinese social life in Johannesburg. Beyond the shopping

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<th>TABLE 1</th>
<th>DEMOGRAPHIC INFORMATION OF JOHANNESBURG INTERVIEWEES</th>
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<td># Of Respondents</td>
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areas, days were spent observing and interacting with Chinese people in Chinatown, eating with local Chinese at hot pot restaurants and shopping in their markets. In part because of my Chinese heritage and ability to speak Mandarin, a rapport was quickly established with Chinese shopkeepers. In some cases, my previous involvement with the Chinese South African community and Chinese churches enabled me to hear stories about shopkeepers through personal connections with members of the church. To avoid bias, however, I never interviewed anyone known personally or who knew me personally from my previous community involvement – as stated above, the interviews were gathered through a sampling process that was kept as random as possible. But these connections provided unique insight into the Chinese shop-keeping community.

In the shopping malls, social interactions were observed between shopkeepers, and participation took the form of helping out with some of my interviewees’ shops by translating from English to Chinese, watching the shop while they ran errands, or moving boxes and stock. Through participant observation, I engaged in many smaller conversations with shopkeepers and asked similar questions as in my interviews. These conversations were often in a small group context, and it was helpful to gain group perspectives on various interview topics.

**FINDINGS: CHOOSING SOUTH AFRICA AS THEIR DESTINATION**

**Common Explanatory Factors for Migration**

Factors long associated with migration, especially income differentials, social networks, and lower barriers to entry, play an important role in encouraging Chinese migrants to move to South Africa. In terms of social networks, relationships with family, relatives and friends helped lower the barriers to entering South Africa. When asked how they decided on South Africa and what other places they had considered, all but one respondent said they based their choice on having family and friends in South Africa. When generally discussing where they might go next, migrants frequently said they needed a relative or friend to already be in the potential destina-

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Because shopkeepers worked every day of the week, church activities held at night in Chinese shopkeepers’ homes were one of the only social organizations and communities that Chinese migrants could engaged in outside of work.
tion. A 24-year-old young man who came to Johannesburg from Fujian province reported, “I would go to Cape Town to do business there. It seems nice and it’s supposed to be safe, but I have no opportunity there. Yes, thinking about going is just thinking about going (xiang shi xiang), but if you don’t know anyone there, how can you go?” This response, delivered as if it were an obvious fact, was typical of the way migrants talked about their decisions of where to move. A few migrants had the option to go places other than South Africa when they decided to leave China – places including Argentina, the United States, Canada, and Switzerland. They had relatives in all these places (in some cases, more relatives than in South Africa), but in the end, they chose South Africa because it was cheaper not only to fly there but to live there as well. A combination of their global social network and the costs of migration limited the array of potential places the Chinese migrants could move. However, while social networks lowered the barriers of entry and narrowed the options of Chinese migrants, just having friends or family in a foreign country was never stated as a sufficient reason for moving. Once migrants decided they wanted to move already, their social networks helped make it possible.

Income differences between China and South Africa, although experientially small for most Chinese migrants, seemed to be an enticement to move to South Africa. When asked about how much respondents earned in China, the reported average income per month was around 1,250 RMB (about $200), ranging from 800 RMB a month to 2,500 RMB a month. On the other hand, migrants’ experience of making money in South Africa varied considerably depending on date of arrival. All those who had arrived over 10 years ago stated that making money was easy and were now living comfortable, if not rich, lives. Chinese migrants who arrived more recently talked about it being a little easier to make money in South Africa, but did not rave about income increases. All those who arrived over the past 2 years said they were not making any much more money than they already had been making in China – some were making less, and some were even losing money. However, the majority of migrants did say that, before deciding to come, they had heard it was easy to make money in South Africa. The evidence suggests that perceived income differences matter, even though the migrants’ actual experiences of income improvements are marginal, especially for recent migrants.

In terms of push factors for migration, the migrants’ narratives did not point to many problems happening in China that forced respondents
out. Indeed, many migrants denied such motivations. Asked what problems in China made them feel like they should leave, many migrants immediately responded that there were no problems in China. “No, no, it’s nothing like that. There’s no problem with living in China,” said one middle-aged woman who had lived in South Africa for 2 years. In several interviews, respondents elaborated that they merely saw an opportunity to travel outside of China and decided to try it out, emphasizing that it was their free choice to leave China. Of the minority of respondents who did mention problems in China, the main problem articulated was the competition and pace of life in China. One 32-year-old man who lived in South Africa for 8 years said, “I feel like China’s lifestyle was too complicated and chaotic (fu za). When I came to South Africa, I felt like the lifestyle here is very peaceful (ping an).” Importantly, China’s complicated lifestyle was not a push factor for this respondent, because he did not realize how chaotic things were in China until after arriving in South Africa.

Besides a chaotic lifestyle, some respondents discussed high living costs and the inability to save money as being issues in China. These respondents mentioned a lack of economic opportunities opened to them saying, “In China, there are economic opportunities, but not for those of us who are uneducated, like me.” However, when casually talking to Chinese shopkeepers, most said it was not a major problem. “Yes, if we need to survive and continue living in China, it’s fine,” said a woman with 4 years of residence in South Africa. A woman next to her elaborated, “This is not really a big problem, because you can definitely find a job and live in China, but if we’re only making 2,000 a month, after food costs, living costs, car, phone, we end up with so little left that we can’t really develop (fa zhan).” The desire to leave China, then, focused not so much on the inability to find a job – they did not feel that something was necessarily pushing them out of China – but a desire to save up money so that they could find opportunities to improve and “develop (fa zhan)” their life.

Adventuring Out

Social networks, barriers to entry, and income differences play a role in explaining Chinese migration to South Africa, but although these are the most common factors usually used to explain migration, they were not the most common self-identified reasons Chinese migrants gave for coming to South Africa. Instead, respondents emphasized factors that are
impossible to quantitate: the desire for adventure and exploration outside of China, the goal of being one’s own boss, and, for some, the enjoyable South African lifestyle that motivates Chinese migrants to stay in spite of hardships. One interesting aspect about the narrative data I collected was the surprising commonality of the responses. Once research moves away from quantifiable data and starts investigating individual desires and motivations, one would expect the great variety in migrants’ backgrounds, personalities, and circumstances to produce an equally wide variety of explanations for why they chose to move. However, in my interviews and participant observations, I found that these three highly subjective desires – for adventure, for self-employment, and for a comfortable lifestyle – were nonetheless mentioned over and over again without any prompting as migrants described their decision-making processes.

The desire to explore abroad (guo wai) serves as a starting point that motivated many Chinese migrants to take the opportunity to go to South Africa when it presented itself. One of the most surprising discoveries in my interviews and participant observation was how Chinese migrants had such a positive feeling about traveling abroad. When asked why they wanted to come to South Africa, 22 out of the 24 interview respondents mentioned, to some degree, the idea that they had never been outside China, and so they could not refuse the opportunity when it came. One young man from Fujian Province told me that “in China, at least where I am from, I feel like everyone has a picture of guo wai as very ideal and wonderfully beautiful (wan mei). So if you are not really poor and have the opportunity to go abroad, of course you will take it!” At first, I thought this view was specific to the Fujian Province, where because of a long history of established ports and outside influence, they would have a particularly positive view of guo wai (Pieke and Mallee, 1999; Chu, 2010). I quickly discovered, however, that even those in the Liaoning Province in northeast China had a similar view. The language Chinese migrants used to describe this desire for adventure and exploration not only centered around a feeling that things outside of China were simply better, but also that while they were still young, they should “have a look and try things out” (shi shi kan and chuang chuang), implying that going on the journey itself, even if things did not work out in their favor, was in itself beneficial.

This resonates with Fong’s (2011) finding that Chinese students want to study abroad so that they can gain access to capabilities generally open only to those in developed countries. Unlike Fong’s college students, however, Chinese migrants in South Africa were not fixated on going to a
developed country and admitted that, in many ways (especially crime, governance, and infrastructure) South Africa was far less developed than China. Instead, the very act of exercising and experiencing the freedom to travel abroad anywhere seemed to be reason enough for them to adventure out. Being able to prove that they could indeed leave China was seen as a privilege not openly accessible to all, and in some ways this in itself was an increase in their capability sets.

**Being One’s Own Boss**

Hearing about the success of migrants in South Africa helps draw some more economically minded migrants to South Africa, but the main economic motivation is not just making more money but specifically about entering a new social class, one in which the migrant is not working for others but working for him- or herself. Being one’s own boss was a highly valued goal of Chinese immigrants in South Africa. Migrants discussed their economic motivations not simply as a journey to earn more money and go where the money was good. Instead, they described their journey with a distinct goal of saving up money so that they could open their own shop/stall. After a few days with one migrant, he explained why he planned to open his own shop saying, “You can choose how hard you want to work. Some people are really ambitious and they want to open up five shops, one in every mall! If you want to work that hard, you can. But if you are satisfied with just one or two shops, then you probably don’t have to work as hard… If you are successful, you can just hire people to work in your shop, and so you can really have freedom to do things you enjoy.” Of the 16 respondents in Johannesburg who did not own their own shop, only one interviewee did not plan to open his own shop.\(^3\) The dream to become self-employed helps explain why even though income differences between China and South Africa were low, the small differential was enough to entice migrants to come because the cost of opening up a shop in South Africa was also low, making the risk also lower. So even though Chinese migrants would not be earning very much more, they knew it would still be possible for them to save up over a few years and open their own shop.

\(^3\)He said it was because he did not mind working for other people and because, with increasing market saturation in Johannesburg, he was unsure that opening his own store would be profitable.
The dream of becoming one’s own boss was one of the central factors encouraging Chinese migrants to come to South Africa. Chinese shopkeepers indicated that they knew nothing about the South African Chinese community, geography, weather, culture, and history before deciding to go to South Africa. One of the two things that Chinese migrants knew about South Africa prior to migrating was the country’s Chinese shop-keeping scene (the other common response being about the country’s crime, which I discuss later in the next section). They had heard stories about how easy it would be to set up their own shop from earlier arriving Chinese migrants who had experienced massive success in the Johannesburg wholesale industry. Their decision to choose to go to South Africa reflects some basic self-awareness of a small pond migration strategy. When migrants had the option to go to other countries more developed than South Africa, they ended up in Johannesburg because they believed they could take advantage of the “smaller pond” and achieve economic freedom in the form of self-employment. One young man at the age of 25 had the option of going to meet his uncle in Greece but said, “If I went there, it would cost me most of my savings just to fly there! Plus, my uncle told me roughly what the monthly living expenses were like… if I go there, I will be stuck working for him forever. South Africa is much cheaper and I can save money and open my own store here.”

One Chinese migrant who had become a successful business owner explained, “Here in South Africa, it is so much easier to be the boss (lao ban). If you have money, you can be a boss. There are so many Chinese here who work for a year and then become a big boss right away!” Nearly all the low educated Chinese migrants I spoke to, both in interviews and in participant observation, described their journey as beginning with working at someone else’s shop (usually a relative) for the first couple of years after arriving in South Africa and then being able to open their own shop. This was the plan for all the Chinese migrants I spoke to who arrived in the past 2 years. Respondents emphasized that the difference between being an employee and owning one’s own shop was huge. “You can’t compare the difference between working (for someone else) (da gong) and being the boss (lao ban)!“" Often times, for respondents over the age of 40, the discussion about owning one’s own shop revolved around retirement. Chinese migrants saw being a boss as a secure way to enter into retirement, and they looked forward to making enough money to move back to China, open a shop there, and retire. The 47-year-old migrant from Hebei who gave up his chemistry job to move to South
Africa explained his actions saying, “(Owning a shop) makes enough money to take care of you and your family, and it gives you something to do when you get older, so that you’re not just bored doing nothing.” The dream of self-employment was so important and powerful that many were willing to sacrifice economic earnings in the short-run for the hope of becoming one’s own boss in the long-run.

**FINDINGS: FACING BARRIERS UPON ARRIVAL**

**Danger and Crime**

Chinese migrants come to South Africa hoping for an adventure in the outside world and dreaming of becoming their own boss. However, when they actually arrive in South Africa, migrants report that they experience many setbacks, some of which are so serious that they cause migrants to give up and go back to China. The main challenge Chinese migrants have to deal with is the high crime rate in South Africa in general and Johannesburg in particular.

Chinese people consistently refer to Johannesburg as a dangerous (wei xian) place, where it is not safe to walk around at night. Shopkeepers retold horror stories of fellow Chinese from neighboring stores who were severely beaten and robbed, sometimes losing hundreds of thousands of South African Rand after just withdrawing money from the bank. Police corruption was also considered normal to South African life. The police were often described as worse than black criminals because Chinese people never felt safe from those who were supposed to protect them and because there was nothing they could do to fight the police. In the end, many respondents said, “It is better to just pay them than get into big trouble.” While at a Chinese mall conducting an interview, I met two middle-aged women in a shop who, after hearing about my project, could not resist telling me all about the terrible crime and corruption in South Africa. They said, “The black people who sell things on the street around this shopping mall hire people to come and steal from our shops. And we can’t do anything about it because when they bribe the security guards

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4 Respondents said that those who committed acts of robbery and violence were always black. Although many of those I spoke to could not distinguish whether these were black South Africans, black foreigners, or both, some Chinese migrants seem to believe they were mostly extremely poor foreigners driven to crime because of their desperate situation.
here.” When I asked about them going to the police, they told me, “The police? What can they do? We have a saying in China, that the police there are like the mafia, but here in South Africa, the police are the mafia!” After talking with them for over a half hour, I was on my way out of the shop when they ran up urgently to stop and tell me, “When you write your thesis, make sure you do not tell anyone anything about us or our shop or anything!” They were afraid of the local police and hired guards would find out and cause trouble for them. This was just one example of the many difficulties that Chinese migrants faced in dealing with crime and corruption.

For most Chinese migrants, race relations only surfaced in relation to problems with crime. When I asked migrants directly about racism and their relationship with different racial groups in South Africa, they had very little to say about the issue, claiming that they got along fine with black workers and because of language barriers could not interact much with local South Africans. But when the issue of crime came up, Chinese migrants often described the situation in racialized terms. The majority of the stories they told would include some remark about how “black criminals” would target Chinese people because they believed Chinese people had lots of money. Besides crime, race was not a salient issue for Chinese migrants. This does not mean that racial identity and race relations is not an important part of the lives of Chinese shopkeepers in South Africa (Park, 2008), but rather that the Chinese people I interacted with rarely brought up the issue of race relations in our conversations.

According to persons interviewed, many Chinese returned to China because of the high crime rate in South Africa and its impact on profits in enterprises owned by Chinese migrants. One respondent expressed a common feeling held among most Chinese people that “if the crime was not so bad, South Africa would actually be a wonderfully beautiful (wan mei) place to live!” Crime and corruption were universally cited as the biggest problems in South Africa. Even if Chinese migrants did not experience crime first-hand, and many of those I spoke with had experienced only small incidents or none at all, everyone lived in fear of crime. Shopkeepers kept warning me that I should never go out at night, and if I do, to be sure not to walk anywhere, not even a block. Many respondents said, “We are too scared to go out at night, so we just go to work and then go home and hide in our homes at night.” Although most individuals seem to experience relatively little difference in their social activities when comparing China to South Africa, some respondents described their lives in China as going out
regularly or weekly with friends and family, while in South Africa, they would be lucky to go out even once a month because of fear of crime. While joining in a conversation between neighboring shopkeepers, they told me several stories of their family members who had returned to China even though they were making more money in South Africa because they could not adjust to the lifestyle of living in fear of crime.

**Market Saturation**

In recent years, there have been so many Chinese migrants coming to South Africa to open their own shops that the wholesale and retail markets are starting to reach a saturation point. While conducting participant observation in different Chinese malls, migrants told me that 7 years ago, there were only three or four Chinese shopping malls. At the time of the research in 2012, there were over twelve different Chinese shopping areas, most of which opened since 2009, with a couple newly opened in 2011 and 2012 with further plans for expansion. Every migrant I interviewed in Johannesburg complained about the oversaturation of Chinese shopkeepers. They told me stories about how their profits have dwindled with each passing year. One woman who had lived in South Africa for 7 years said, “The money used to be great – easy to make. Now, there are some months that we lose money! At the beginning and end of the month, around Christmas and New Year’s, you can still make good money, but months like this month? It is very difficult.” While the first movers experienced easy success opening their own stores and making lots of money, migrants who arrived within the past 2 years struggle to make a profit and in some cases lose money from their entrepreneurial efforts. All the migrants I spoke with knew of at least one friend who decided to go back to China because of the oversaturation of Chinese shops, either deciding that they had made enough money and would try their luck in China or giving up on achieving the success they had hoped for.

**FINDINGS: CHOOSING TO REMAIN IN SOUTH AFRICA**

**Weather and Environment**

In spite of the difficulties they encounter in terms of crime and bad business, at the time of my research, the number of Chinese shopkeepers in South Africa is still increasing. Migrants come, experience hardships
firsthand, and still decide to stay in the country. The experience of weather, environment, and a slower lifestyle, for many migrants, become good reasons to continue living in South Africa, even for those whose economic expectations were not met. When asked what was the best thing about South Africa, nearly every single Chinese migrant mentioned the environment. “South Africa is actually a beautiful country! If not for the crime, I think many Chinese people would come here.” One woman who had lived in South Africa for 7 years said, “The weather here is excellent. In China, the winter is so cold and the summer is so hot – you’re just freezing or sweating, and suffering the whole time. Here, it is nice all year round!” At first, I did not take these remarks too seriously, as I thought it was somewhat of a joke – as if they were saying they enjoyed so little about South Africa, the only good thing worth mentioning was the weather. But as I spent more time with Chinese migrants, I realized that not only was this one of the biggest reasons to recommend South Africa to others but it was also an important value that improved their lives. Formerly, urban-dwelling Chinese migrants often remarked about the pollution in China, saying things like, “In China, the pollution is terrible. Here, you have beautiful mountains and a really nice environment. It’s nice here.” When asked what the biggest benefit to staying in South Africa would be, a surprisingly common response was the weather and the environment.

A Slower Pace of Life

In addition to these factors, Chinese migrants after arriving in South Africa enjoy and prefer the slower pace of life. They often described the life in China as chaotic and too complicated. When asked specifically why, they mentioned issues of factory work, increased competition (both in school and in finding a job) resulting in increased pressure, and long, busy, and harsh work environments. After arriving in South Africa, many Chinese migrants immediately feel like life is less burdensome and lighter (qing song). One young man who used to be a mechanic in China described the situation well:

Life here is much lighter (qing song) than in China. In China, you have to get up and work at six or seven in the morning and then work until sometimes nine or ten at night. Here, you only work at nine or ten in the morning until around five in the afternoon. Sometimes, we have to stay late to do inventory, but that is only maybe once a month. Plus, the atmosphere in South Africa in general is more relaxed. In China, maybe because
there are so many people, you feel like the pressure (ya li) of life is just really heavy – like you have to compete all the time. Here, the culture and the society in general is just more relaxed and lighter (qing song).

Some of these migrants who just arrived in the past 2 years saw the slow pace as a bad thing, saying that life is too simple and boring. But those who have stayed at least 5 years seemed to have adjusted and talked about how they really preferred their lives in South Africa. These migrants commonly hear about how difficult and full of pressure their families’ and friends’ lives are back in China. Although only two respondents mentioned this explicitly as a deterrent to returning back to China, most talked about it as a valuable benefit to staying in South Africa.

The migrants’ experience of a slower pace of life is one of the effects of small pond migration. Whereas some migrants want to move up to bigger ponds (more developed countries) and compete in environments where there is often a faster-paced culture, a small pond migration strategy instead looks to leave these kinds of environments to avoid harsh competition. The entire mobility strategy of moving up to living in a higher HDI country implies that the migrant wants to tackle competition head on. Migrants that choose to stay in South Africa do so because they find that a smaller pond is the right place for them. They enjoy a slower pace of life and even complain about the intense competition that they faced at home in China.

Admittedly, because the scope of this research project is limited to Chinese migrants who were in South Africa at the time I conducted my research in 2012, these responses about the benefits of staying in South Africa come from a self-selected group of those who chose to stay. I heard stories of Chinese migrants whose relatives and friends decided to return to China because the pace of life was too slow or because of the problem with crime. As with any migration strategy, there will always be some migrants who, after trying to employ a small pond migration strategy, realize this was not the life they wanted – the costs associated with moving to a less developed place were not worth the potential benefits.

Each explanatory factor has a specific role in the narrative of Chinese migrants to South Africa. A cultural factor in China creates a desire to explore the guo wai, giving potential migrants a feeling that it is a privilege to adventure out of China. This, along with dissatisfaction with their socioeconomic situation, acts as a starting point. Then, social networks and barriers to entry limit the possible options of where migrants consider going. Many end up choosing South Africa and employing a small pond
migration strategy because there is an opportunity to pursue a dream of being one’s own boss. Although the most recent migrants experience the harsh reality of the difficulty of achieving this dream, and some migrants do return to China after a time, those who stay point to the hope of becoming self-employed, the weather, the environment, and a slower paced lifestyle as strong reasons to continue living in South Africa despite low economic gains. Overall, Chinese migrants experience an increase in capabilities through exercising their freedom in mobility and exploring guo wai, gaining economic facilities through slight income increases and lower costs in South Africa, and experiencing a better daily lifestyle in more comfortable and peaceful living. Some migrants, especially early-comers, have achieved their dream of stable self-employment and, in this way, have increased their freedoms – not simply by earning more money but also by having the freedom to choose how to spend their time and live their daily lives.

**SMALL POND MIGRATION: MAXIMIZING THE UTILITY OF EXISTING CAPITAL**

The case of Chinese migrants in South Africa is exemplary of employing a small pond migration development strategy. As stated earlier, small pond migration is one form of migration as development (utilizing mobility to increase one’s capabilities set). In small pond migration, migrants move to a lesser developed place because certain characteristics of this place effectively increase the migrant’s social, economic, and human capital. While the concept of small pond migration was not explicitly expressed by all respondents, several Chinese migrants did articulate the specific idea of wanting to be a big fish in a smaller pond. When asked where they would consider moving to if they left South Africa, one respondent said, “We aren’t considering going to any developed place, like the U.S. or Europe. Instead, the only places besides China we’re thinking about are even more backward (luo hou) places, like Mozambique or Zimbabwe.” The most common places that Chinese migrants considered moving to besides China were areas outside Johannesburg, which they called “shan xia” which literally translated means the foot of a mountain. This refers to rural villages between 50 and 300 km away from major cities, like Johannesburg, Durban, and Bloemfontein. The Chinese people frequently talked about how, if the business continued to deteriorate in Johannesburg, they would consider moving to shan xia locations to do
business, where they hear from relatives that business is good, despite poor infrastructure, housing, and safety. This way of thinking reveals the Chinese migrants and their desire to employ a small pond migration strategy, where they consider moving to a lesser developed area to face less competition, thereby helping them to achieve their goals.

Small pond migration provides Chinese migrants with rather immediate increases in effective capital. In terms of social capital, Chinese migrants moved to South Africa with the help of family and friends who have already started their own businesses. This provides them a social connection with those who have already succeeded in achieving the goal of stable self-employment. While migrants lived in China, these connections were only useful insofar as they received remittances from South African family and friends. Arriving in South Africa, however, Chinese migrants are now able to utilize these connections for job opportunities and to start their own businesses. Relatives helped to plan visas and even pay for Chinese migrants to come to South Africa. Not only would these earlier arriving relatives provide newly arriving Chinese migrants with jobs in their shops, they would also provide housing and the support needed to transition into a new country. From these early stages, Chinese migrants further utilized familial ties to make more business connections with suppliers and mall owners, and after typically a year or two, they used these connections to venture out and open their own stores. While potential Chinese migrants have always had these social ties to relatives in South Africa, coming to South Africa expands the effective use of their social capital. Here, the characteristic that allows for this expansion in social capital has nothing to do with the geographic place of South Africa, but instead, the specific history of Chinese people successfully doing business in South Africa and a growing Chinese population there (Hart, 2002; Park, 2012).

Chinese migrants also experience an increase in their economic capital. One way this occurs immediately is because of exchange rates and lower living costs. Migrants, even those with less than high school education, were acutely aware of the exchange rate between China and South Africa, saying things like “business is not as good now, because the exchange rate is not as good. When we first came, it was something like 1.5 or 1.6, but now it’s more like 1.3.” Also, most migrants, when asked about how their economic situation compared since arriving in South Africa, talked about lower living costs using them to evaluate their real incomes. Migrants would discuss, in detail, the costs of rent, food, and
transport and explain how things are cheaper across the board in South Africa. Mostly importantly, South Africa was understood as a good place for migrants’ quest for self-employment, as South Africa had such low investment costs. Overall, Chinese migrants approximated the cost of opening a shop in South Africa as about four times cheaper than in China because of cheaper rent and lack of government regulations. The smaller and less developed economy of South Africa works in Chinese people’s favor, providing lower costs and effectively increasing the migrants’ economic capital.

Finally, in terms of human capital, although moving to South Africa does not actually improve one’s human capital, it does allow for one’s existing education and skills to be more competitive and thereby more effective. Migrants talked about the huge population in China and that to gain access to new opportunities available in China’s growing economy one had to be a successful student. On young migrant who came to South Africa shortly after high school said, “Because I did not do well in school, I cannot compete in China’s economy.” Although this was not a central decision-making factor in the migrants’ narratives, migrants still felt that despite their low education they had far more opportunities in South Africa. Chinese self-made entrepreneurs had no education or background in business, yet they had no problems opening shops. A man in his thirties who had successfully opened his own shop 8 years ago said, “What education? What do you need to know? Opening a shop is easy! You can learn everything just by doing it.” Respondents felt they could not compete in China, especially with little to no experience in business (prior to coming to South Africa), and several migrants explicitly said that they came to South Africa to gain that experience so they would have a better chance doing business in China when they went back.

Another added benefit revolves around South Africa being an English-speaking country. Although it might seem like a barrier for Chinese migrants to move to a place where they do not know the language, respondents actually saw it as an expansion of their capabilities. The issue of language is unlike the aforementioned examples of capital, where small pond migration results in an immediate and effective increase in capital. But migrants believed it was important for them to learn English as a skill that made them more economically competitive, especially if they were to go back to China, and living in an English-speaking country provided them with the opportunity to more easily learn English. With the exception of the few respondents that had university education, all migrants
said they had poor English upon arriving in South Africa. Those who had stayed longer explicitly said they wanted their kids to eventually come to South Africa so that they could learn English. At the same time, however, they did not feel that the lack of complex English skills decreased their effective human capital, because they did not believe their lack of English would prevent them from doing business. When I asked a respondent how they do business without speaking any English, he remarked, “What English do I have to know? Just some numbers and prices… other than that you just point and make it work. We really do not need much English to do business here.” From the perspective of most respondents, moving to an English-speaking country was beneficial because it enabled them to easily learn the language and was not a barrier or hindrance to their economic goals.

Small pond migration as a development strategy is not without its drawbacks – Chinese migrants had to give up certain freedoms to expand other capabilities. In general, a primary reason why most migration patterns are from lower-HDI countries to higher ones is that moving to a more developed country immediately provides socioeconomic structural and living standard benefits (United Nations Development Report Team, 2009). A lesser developed country may come with poorer infrastructure, bad housing, and weak government. In the case of South Africa, Chinese migrants lose capabilities and freedoms associated with the high amounts of crime and corruption in Johannesburg. Chinese migrants’ freedom to go out at night and enjoy social activities is the one major trade-offs they must endure in living in South Africa.

CONCLUSION

Chinese migrants have journeyed to South Africa to utilize a small pond migration strategy, effectively increasing their social, economic, and human capital. They come to South Africa not only to use this capital to obtain their goal of stable self-employment, but also to experience life abroad, something that exercises their freedom of mobility and has intrinsic value. Although some have returned to China due to low economic returns and high crime, many have stayed because of comfortable weather, beautiful environment, and a slower, less chaotic lifestyle. These migrants have accepted the loss of freedoms associated with crime, such as going out at night, in return for a more comfortable life and the pursuit of their dream of being their own boss.
Applying Sen’s capabilities approach to the field of international migration provides a more narrative-focused framework that deepens our understanding of why people migrate and why certain migration patterns exist. Small pond migration, a mobility strategy in which the migrant moves to a smaller pond to effectively gain capital and become a big fish, helps explain the seemingly peculiar case when migrants move from more developed countries to lesser developed ones. Analyzing migration patterns based on a mobility-as-development-strategy framing would prioritize thinking about the way mobility is utilized to improve one’s life, rather than focusing on the country of origin and destination. This provides a useful way to compare migration patterns across many geographic locations, such as the divide between south–north and south–south migration patterns, and even cases of north–south migration.

Although the use of small pond migration is not necessarily a new phenomenon (Østbø and Carling, 2005), this case suggests a change in the dynamic of how potential migrants utilize such migration. Prior research has documented Chinese migration to Southeast Asia (Purcell, 1965; Suryadinata, 1997; Chua, 2004). More recent studies have described Chinese migration to Latin America (Siu, 2005; Devlin, Estevadeordal, and Rodriguez-Clare, 2006; Lai and Chee-Beng, 2010). Recent Chinese migration to regions within Africa may constitute new spatial patterns. These patterns may further suggest that forces of globalization (specifically decreasing costs of social contacts over wider spaces, decreasing transportation costs of goods, and increasing linkages across geographic and cultural spaces) open up more possibilities for small pond migration to become a viable development strategy for aspiring migrants and households in the global south. The case of Chinese migrants to South Africa provides evidence for how migrants may employ this strategy.

From a policy perspective, this case reveals the importance of understanding non-traditional factors that influence migrants and their decisions to migrate. Government policies that seek to control migration tend to focus on factors such as labor market structures and migrant family and friend networks (Boyd, 1989). Small pond migration suggests that monetary, fiscal, and trade policies not commonly associated with immigration have major implications for migration patterns. Because of the important role of exchange rates and transaction costs of importing goods for migrant entrepreneurs, governments seeking to control migrants employing a small pond migration strategy could utilize monetary, fiscal, and trade policies to either encourage or curb migration flows. The findings in
this case study suggest that currency exchange rates may have a larger-than-expected influence on migrants and their decision making, as these exchange rates affect the migrant’s standard of living in the destination country as well as their ability to get the most out of their existing economic capital. Further research is required to understand the relationship between currency and migration patterns.

This case may also anticipate the future for countries and contexts throughout the continent of Africa. Although some historical connections existed between China and South Africa, the first large wave of Chinese migrants came to South Africa 40 years ago when the apartheid government engaged in business partnerships with the Taiwanese government. Currently, the Chinese government invests aggressively in 49 countries throughout Africa with trade flows amounting to $120 billion, making China Africa’s biggest trading partner. Just as unplanned Chinese migration flows to South Africa show little signs of slowing, it is likely that Chinese government contracts will increase informal migration networks, providing more places and opportunities for potential Chinese migrants to utilize a small pond migration strategy all over the African continent. Chinese entrepreneurs in Cape Verde off the coast of West Africa are an example of the increasing Chinese influence and expansion on the African continent (Østbø and Carling, 2005). Awareness of this growing phenomenon encourages governments to act preemptively to understand the effects of Chinese migration and seek out ways to benefit from it. This also suggests further research on the complex relationship between immigration and trade (White, 2007; Head and Ries, 1998) – specifically suggesting that while international migration results in more bilateral trade, trade may also result in increasing immigration. Because the case of Chinese migrants to South Africa begins 40 years ago, it serves as an important first predictor and potential model for emerging Chinese–African migration patterns.

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Predicting health behaviors with an experimental measure of risk preference

Lisa R. Anderson, Jennifer M. Mellor*

Department of Economics, Morton 110, College of William and Mary, P.O. Box 8795, Williamsburg, VA 23187-8795, United States

Department of Economics and Thomas Jefferson Program in Public Policy, Morton 110, College of William and Mary, Williamsburg, VA 23187-8795, United States

Abstract

We conduct a large-scale economics experiment paired with a survey to examine the association between individual risk preference and health-related behaviors among adults aged 18–87 years. Risk preference is measured by the lottery choice experiment designed by Holt and Laury [Holt, C.A., Laury, S.K., 2002. Risk aversion and incentive effects. The American Economic Review 92(5), 1644–1655]. Controlling for subject demographic and economic characteristics, we find that risk aversion is negatively and significantly associated with cigarette smoking, heavy drinking, being overweight or obese, and seat belt non-use. In additional specifications, we find that risk aversion is negatively and significantly associated with the likelihood a subject engaged in any of five risky behaviors and the number of risky behaviors reported.

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1. Introduction

Risk preference influences a variety of economic behaviors under uncertainty, such as investment, portfolio choice, job change, and migration. In the field of health economics, attitudes toward risk are likely to affect the purchase of health insurance, the use of preventive medical care, and the propensity to engage in behaviors that either increase or decrease mortality risk, such as cigarette smoking or seat belt use. Despite the importance of individual-specific risk preference, there is no consensus on how best to measure it or control for its contribution to economic behaviors. Recent studies have employed various survey questions dealing with hypothetical gambles (e.g., Barsky et al., 1997), hypothetical willingness to pay for risky assets (e.g., Guiso and Paiella, 2005), and self-reported attitudes toward risk (e.g., Dohmen et al., 2005). These survey-based measures of risk preference have shown the expected relationship with risky health-related behaviors in some, but not all, such studies. One concern about survey questions is that choices made in hypothetical situations may not reflect actual behaviors when real money is at stake. Further, evidence from experimental economics suggests that respondents’ reports of their own attitudes do not always reflect their actual behaviors (e.g., Glaeser et al., 2000). These issues motivate the use of economics experiments to generate additional measures of subject-specific risk preference.

* Corresponding author. Tel.: +1 757 221 2852; fax: +1 757 221 1175.
E-mail addresses: lrande@wm.edu (L.R. Anderson), jmmell@wm.edu (J.M. Mellor).

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The primary contribution of this paper is a methodological one. We pair a widely used economics experiment designed to measure risk preference (the lottery choice experiment designed by Holt and Laury (2002)) with a survey that measures several risky health-related behaviors, and we use the resulting data to test whether risk preference measured by the experiment is associated with surveyed behaviors. This general approach has been reported in only a few prior studies, and ours is the first study to focus exclusively on health behaviors. Our methodological contribution is enhanced by the use of a subject pool that is both large and diverse when compared to those derived from most economics experiments, many of which consist of undergraduate students. Using data from one of the largest replications of the lottery choice experiment, we examine a sample of more than a thousand adult subjects ranging from 18 to 87 years of age. All subjects in our experiment received immediate financial payments based on their decisions, so that the stakes in the lotteries were not simply hypothetical.

Our empirical results show that an experimental measure of risk preference is significantly associated with several risky health behaviors measured in our survey. Controlling for a number of subject demographic and economic traits, we find that laboratory-measured risk aversion is negatively and significantly associated with cigarette smoking, heavy episodic drinking, being overweight or obese, and seat belt non-use. In other specifications, we find that the experimental measure of risk aversion is negatively and significantly associated with the likelihood of reporting any of five risky behaviors, the number of risky behaviors reported, and a factor-analysis-based measure of subjects’ underlying propensity to engage in risky behavior. Thus, our findings provide additional evidence that certain health behaviors are influenced in a consistent manner by preferences toward risk. Because two of the behaviors significantly associated with our experimental measure of risk aversion are smoking and seat belt non-use, our results also offer additional support for the use of these behaviors as proxies for risk preference. Finally, our findings demonstrate the potential benefits of linking experimental tasks to household surveys.

2. Measuring individual-specific risk attitudes

Before introducing our methodological approach, we first describe existing techniques for measuring individual-specific attitudes toward risk. The literature review makes several points relevant to our work. First, there is no single or standard choice of proxy for risk preference. Second, only a small number of studies have used experimental measures to generate a measure of risk preference and examine its relation to risky behaviors. Third, compared to these prior studies, our work has a unique focus on health behaviors and draws on a subject pool that is both exceptionally large and diverse in age.

Past research studies have measured individual-specific attitudes toward risk with measures of hypothetical behaviors, actual behaviors, and self-reported attitudes. Among the measures involving hypothetical scenarios, the most common deals with hypothetical gambles. For example, questions on the 1992 Health and Retirement Study (HRS) ask respondents to choose between two jobs, one with a certain income and another with a 50% chance of doubling income and a 50% chance of reducing income by one-third, one-fifth, or one-half. Based on their job choices, respondents can be classified into one of four categories ranging from least risk tolerant to most risk tolerant; alternatively, it is possible to construct a cardinal measure of risk tolerance from the responses as is done in Barsky et al. (1997). Variations of these questions have also appeared in the Panel Study of Income Dynamics (PSID) (e.g., Luoh and Stafford, 2007), a 1997 survey of French households (e.g., Arrondel, 2002) and a 1998 survey of Dutch households (e.g., Kapteyn and Teppa, 2002). In all cases, the questions offered subjects the choice of a safe job with certain earnings of Y and a risky job with expected earnings greater than Y.

As a result, the questions can be used to classify subjects at different levels of risk aversion, but not as risk-loving or risk neutral.

Methods derived from hypothetical gamble questions have been used to predict health-related risky behaviors in a number of studies. For example, controlling for age, sex, race, and religion, Barsky et al. (1997) reported that respondents in the HRS with larger parameter values of risk tolerance were more likely to smoke, drink, and not own health insurance. In contrast, Picone et al. (2004) found that the coefficient on a risk tolerance parameter was either statistically insignificant or significant and of the wrong sign in models of the demand for preventive medical tests. Sloan and Norton (1997) reported insignificant coefficients on categorical dummies for risk aversion in a model of long-term care insurance demand. Lahiri and Song (2000) reported that a categorical dummy for risk aversion had a negative and significant effect in a model of smoking initiation but an insignificant effect in a model of smoking continuation. Finally, Dave and Safer (2007) found that a categorical dummy for risk aversion had a negative and significant coefficient in models of alcohol consumption.

Individual risk preference has also been measured with questions on other hypothetical behaviors. For example, Guiso and Paiella (2005) used hypothetical willingness to pay for a risky asset to examine decision making in the 1995 Bank of

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1 In later waves of the HRS, additional questions increase the number of categories to six.

Italy Survey of Household Income and Wealth. Risk aversion indicators had significant negative effects on the likelihood of having a chronic disease, but unexpected negative effects in models of health insurance ownership.

Another approach is to use measures of actual behaviors to proxy for risk preference. For example, Viscusi and Hersch (2001) and Hakes and Viscusi (2007) used smoking status to control for risk preference in models of job risk-taking and seat belt use, respectively. In related work, Hersch and Viscusi (1998) showed that smoking status predicted risk-reducing preventive health behaviors, such as tooth flossing and blood pressure monitoring. One concern about using smoking to capture risk preference is that it may also reflect time preference (e.g., Fuchs, 1982; Evans and Montgomery, 1994). However, the same concern is unlikely to apply to seat belt non-use, another behavioral measure of risk preference. Hersch and Viscusi (1990) validated both smoking and seat belt use as proxies of risk tolerance in a study of compensating differentials for risky jobs.

Finally, questions on self-reported attitudes are another means of measuring individual risk preferences. Dohmen et al. (2005) is a notable example of this approach. More than 20,000 subjects from German households were surveyed about their general willingness to take risks on a scale of 0–10. A binary measure of risk tolerance constructed from this scale was used in models of various behaviors, and found to have positive and significant effects on smoking participation, stock investment, self-employment, and sports participation.

The Dohmen et al. study is especially relevant to our work because it also provides an experimental validation of the attitudinal risk tolerance measure using a representative sample of 450 adult individuals living in Germany. Subjects in this sample completed a questionnaire containing the same set of attitudinal questions used in the larger survey, and then participated in a lottery choice experiment. For each of 20 decision rows, subjects had to choose either a lottery with expected winnings of €150, or a safe monetary amount that increased in size across the rows from €0 to 190. The point at which subjects switched from the lottery to the safe option indicated risk preferences: the higher the value of the safe option at the switch point, the more risk tolerant the subject. The survey-based attitudinal measure of risk tolerance was found to be a significant predictor of the experimental measure even upon controlling for a number of subject traits. Thus, this study provided important validation of the attitudinal measure of risk-taking, although the authors did not report whether the experimental measure of risk-taking was itself associated with smoking status. It is also worth noting that while large monetary payoffs were used to motivate incentive-compatible decision-making, subjects were informed that only one in seven would be paid for their decisions, and payments were made in checks sent by mail.

We know of only a few other studies that use economics experiments to both measure risk preference and compare the resulting measure to survey-based questions on risky behavior. Kruse and Thompson (2003) took this approach in studying the hypothetical willingness to pay for a risk mitigation device. They compared subject responses about willingness to pay for a lock that reduced the chance of burglary to subject play in an experiment with identical losses and probabilities, but with real money at stake. The experimental and survey-based measures were consistent on average, but on an individual level they were consistent for less than one-quarter of the subjects. Lusk and Coble (2005) compared subject responses to survey questions on the willingness to consume genetically modified foods to subject decisions in a lottery choice experiment. Their results are described in detail in the next section (since they use the same lottery choice experiment we employ), but their main finding is that the experimental measure was significantly associated with risk-taking behavior.

While our study is related to these three prior studies, it makes several new contributions. First, our study is the first to pair an experimental measure of risk preference with several common health risk behaviors. Findings from Dohmen et al. (2005) suggest that an experimental measure might be associated with smoking, but this was not explicitly examined; moreover, the majority of subjects in the experiment were not paid based on their lottery choices. Second, our study uses an exceptionally large sample of more than a thousand subjects, roughly twice the number used in Dohmen et al. and 20 times the sample size used in Lusk and Coble (2005). Finally, while our data do not allow us to make direct comparisons of all measures of risk preference described above, we are able to compare our experimental measure of risk preference to two commonly used measures defined from actual behaviors, seat belt non-use and smoking. In this way, our results are able to inform the choice of proxy measures used in future studies.

3. An experimental measure of risk preference

To examine whether an experimental measure of risk preference is associated with health-related behaviors, we used data from a large-scale experiment involving more than one thousand subjects. We employed one of the most widely used experiments designed to capture risk preference—the lottery choice task from Holt and Laury (2002). A major advantage of this design relative to other experiment-based studies of risk aversion is that the task is simple and context free. Another advantage is that subjects are not placed in the role of buyer and seller to elicit certainty equivalents, which is important

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3 Hartog et al. (2000) also used this type of survey question, and Kruse and Thompson (2003) used a survey question on willingness to pay for a risk mitigation device. Neither study focused on the relationship between risk attitudes and reported health behaviors.

4 These measures had significant coefficients of the expected sign in models of self-employment, ownership of risky assets, moving, and changing jobs.

5 In another such study, Kapteyn and Teppa (2002) used attitudinal measures of risk tolerance to predict portfolio choice.

6 Dohmen et al. (2005) also employed five measures of willingness to take risks in specific domains; three of these had positive and significant coefficients in the smoking model. Another risk preference measure was based on subject responses to a question about the fraction of hypothetical lottery winnings they would invest in a risky asset. This measure was not significantly related to smoking.
given ample evidence that the amount subjects are willing to accept for an item is often significantly higher than the amount they are willing to pay, especially for goods without close substitutes such as reduced health risks (Horowitz and McConnell, 2002). Additionally, this experimental measure can be used to identify subjects with risk-loving or risk neutral preferences, unlike some alternate measures.

A major advantage of using an experiment to measure risk preference is that it can provide incentive-compatible measures of subject traits; in our case this comes from paying all subjects in cash at the end of the experiment based on their lottery choices. However, it should be noted that there is not unanimous support for linking measures of financial risk tolerance to measures of risk tolerance in other settings, such as health, employment, or mobility. In fact, Kaplow (2005) found that estimates of individual risk aversion from the financial economics literature did not reconcile with estimates of the value of a statistical life from the labor economics literature. Psychological evidence also suggests that risk tolerance is a domain-specific trait, likely because of differences in the way individuals perceive the riskiness of specific activities (Weber et al., 2005), but this issue is still debated. For example, Dohmen et al. (2005) reported that the correlation coefficients for measures of general attitudes toward risk and several context-specific attitudes toward risk were large and highly significant. While fully resolving whether risk tolerance is domain-specific or generalized is beyond the scope of this paper, our work follows many of the studies cited earlier in attempting to link a financial-based measure to non-financial behavior.

In the basic Holt and Laury design, subjects made 10 choices between Lottery A and Lottery B. Lottery A paid either $2.00 or $1.60 and Lottery B paid either $3.85 or $0.10. In any decision row, Lottery A was the “safe” choice, and Lottery B was “risky” since Lottery A had less variability in the payoffs than Lottery B. The decision rows differed in terms of the probability of winning the higher prize in each lottery. In Decision 1, the higher prize (either $2.00 or $3.85) was paid if the throw of a 10-sided die was 1 and the lower prize (either $1.60 or $0.10) was paid for any other throw of the die. For Decision 2, the higher prize was paid if the result of the die throw was 1 or 2 and the lower prize was paid if the die throw was 3–9. This pattern continued so that by Decision 9 there was a 90% chance of winning the higher prize, and that Decision 10 was a choice between a certain $2.00 for Lottery A and a certain $3.85 for Lottery B. Once all 10 decisions were made, a die toss determined which decision row (1–10) would be chosen for payment, and a second die toss determined the result of the particular lottery chosen by the subject.7

Table 1 shows the paired lottery choices for the 10 decisions in our experimental design, in which payoffs are three times the Holt and Laury (2002) baseline amounts.8 In Decisions 1–4, the expected payoff for Lottery A is higher than the expected payoff for Lottery B; in Decisions 5–10, Lottery B has a higher expected payoff. Thus, Lottery A, the safe choice, will be chosen four times by a risk neutral subject, more than four times by a risk averse subject, and less than four times for a risk-loving subject. In Holt and Laury (2002), the lottery choice experiment was conducted with 212 subjects who were a mix of undergraduate students, MBA students, and business school faculty. Twenty-six percent of the subjects were risk neutral, 8% were risk loving, and 66% were risk averse.

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Table 1
Lottery choice experiment

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>(E(A) - E(B))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive $6.00 if die throw is 1; Receive $4.80 if die throw is 2–10</td>
<td>Receive $11.55 if die throw is 1; Receive $0.30 if die throw is 2–10</td>
<td>3.50</td>
</tr>
<tr>
<td>2</td>
<td>Receive $6.00 if die throw is 1–2; Receive $4.80 if die throw is 3–10</td>
<td>Receive $11.55 if die throw is 1–2; Receive $0.30 if die throw is 3–10</td>
<td>2.49</td>
</tr>
<tr>
<td>3</td>
<td>Receive $6.00 if die throw is 1–3; Receive $4.80 if die throw is 4–10</td>
<td>Receive $11.55 if die throw is 1–3; Receive $0.30 if die throw is 4–10</td>
<td>1.49</td>
</tr>
<tr>
<td>4</td>
<td>Receive $6.00 if die throw is 1–4; Receive $4.80 if die throw is 5–10</td>
<td>Receive $11.55 if die throw is 1–4; Receive $0.30 if die throw is 5–10</td>
<td>0.48</td>
</tr>
<tr>
<td>5</td>
<td>Receive $6.00 if die throw is 1–5; Receive $4.80 if die throw is 6–10</td>
<td>Receive $11.55 if die throw is 1–5; Receive $0.30 if die throw is 6–10</td>
<td>0.38</td>
</tr>
<tr>
<td>6</td>
<td>Receive $6.00 if die throw is 1–6; Receive $4.80 if die throw is 7–10</td>
<td>Receive $11.55 if die throw is 1–6; Receive $0.30 if die throw is 7–10</td>
<td>0.15</td>
</tr>
<tr>
<td>7</td>
<td>Receive $6.00 if die throw is 1–7; Receive $4.80 if die throw is 8–10</td>
<td>Receive $11.55 if die throw is 1–7; Receive $0.30 if die throw is 8–10</td>
<td>0.25</td>
</tr>
<tr>
<td>8</td>
<td>Receive $6.00 if die throw is 1–8; Receive $4.80 if die throw is 9–10</td>
<td>Receive $11.55 if die throw is 1–8; Receive $0.30 if die throw is 9–10</td>
<td>0.35</td>
</tr>
<tr>
<td>9</td>
<td>Receive $6.00 if die throw is 1–9; Receive $4.80 if die throw is 10</td>
<td>Receive $11.55 if die throw is 1–9; Receive $0.30 if die throw is 10</td>
<td>0.45</td>
</tr>
<tr>
<td>10</td>
<td>Receive $6.00 if die throw is 1–10</td>
<td>Receive $11.55 if die throw is 1–10</td>
<td>0.55</td>
</tr>
</tbody>
</table>

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7 Note that subjects in the experiment were not faced with the possibility of a financial loss of their own money; few experimental designs incorporate such a feature out of concerns related to human subjects approval and recruitment. Nonetheless, Clark (2002) compared subject behavior in a public goods game with own-money and “house-money” treatments and found no difference in average contributions.

8 Though tripled, our payoffs still result in an average payment of $7, which may be low relative to the value of subjects’ time. This may result in lower levels of measured risk aversion, based on findings from Holt and Laury (2002). They directly tested the effect of payoff amounts on subject behavior by having subjects repeat the series of 10 decisions under four payoff treatments. The low payoff treatment is described above and the high payoff treatments scaled up the low payoffs by a factor of either 20, 50, or 90. While the scale of payoffs did not affect behavior when payoffs were hypothetical, increasing the scale of real payoffs made subjects act more risk averse on average.
The Holt and Laury (2002) design has been used in many subsequent studies to examine risk attitudes. For example, Harrison et al. (2007a) studied the relationship between demographic characteristics and lottery choice decisions using a Dutch subject pool, and Harrison et al. (2007b) ran the lottery choice experiment in the context of a rare coin market to examine the effects of framing and background risk. Two studies used the Holt and Laury (2002) lottery choice experiment to study risk preferences of workers who chose occupations with risky income streams. As noted earlier, our study is closely related to Lusk and Coble (2005) which used the Holt and Laury (2002) lottery choice experiment to predict preferences for and consumption of genetically modified food. Subjects made a series of ten choices with real payoffs roughly five times the amounts used in the Holt and Laury (2002) low payoff treatment. Fifty undergraduate students participated, and average earnings were $12 (plus a $10 show up payment). Lusk and Coble (2005) found that individuals who were more risk averse in the lottery choice experiment were significantly less likely to report purchasing and eating genetically modified food on a post-experiment survey. Like Lusk and Coble (2005) we focus on the relationship between a measure of risk preference defined from the lottery choice experiment and measures of risky behaviors. Our focus is on behaviors that have well-known and significant risks to health status, such as smoking, alcohol use, and seat belt non-use. We know of no previous study that pairs a lottery choice experiment with survey-based measures of these health-related decisions. Finally we use a considerably larger subject pool, which we describe in the next section.

4. Experimental methods

Non-student adult subjects were recruited from the greater Williamsburg, Virginia area by contacting a variety of local organizations and posting flyers in public places. Student subjects were recruited from various undergraduate and graduate courses at the College of William and Mary. A total of 1094 subjects participated in the experiment, making this study one of the largest replications of the lottery choice experiment. Prior to the experiment, instructions were distributed to subjects and read aloud. Subjects then made 10 decisions with real payoffs that were three times the low payoffs used in Holt and Laury (2002). Appendix A includes copies of the instructions and decision sheet. Once all decisions were recorded, 1 of the 10 was randomly chosen for payment, and earnings averaged $6.90.

In our lottery choice experiment and in others, subjects generally begin by choosing Option A (the safe option) in Decision 1, when the chance of winning the higher Option B payoff is relatively small. The point at which subjects switch from the safe option to the risky option can be used to define a range of values for the subject’s risk aversion parameter. We follow Holt and Laury’s procedures for defining upper and lower bounds on this parameter by assuming a utility function of constant relative risk aversion:

\[ U(Y) = \frac{Y^{1-r}}{1-r} \]  

where \( r \) is the coefficient of relative risk aversion (CRRA), and \( Y \) is the payoff in the lottery. To illustrate, consider an individual who chooses the safe option in the first three decisions, then chooses the risky option for each subsequent decision. The lower bound of the CRRA can be determined by solving for \( r \) such that the individual is indifferent between Option A and Option B at Decision 3:

\[
0.3 \frac{6^{1-r}}{1-r} + 0.7 \frac{4.80^{1-r}}{1-r} = 0.3 \frac{11.55^{1-r}}{1-r} + 0.7 \frac{0.30^{1-r}}{1-r} \quad \iff \quad r = -0.49
\]

For the same individual, the upper bound is \( r \) such that the individual is indifferent between Option A and Option B at Decision 4:

\[
0.4 \frac{6^{1-r}}{1-r} + 0.6 \frac{4.80^{1-r}}{1-r} = 0.4 \frac{11.55^{1-r}}{1-r} + 0.6 \frac{0.30^{1-r}}{1-r} \quad \iff \quad r = -0.15
\]

Values of \( r < 0 \) indicate risk-loving preferences, \( r = 0 \) indicates risk neutrality, and values of \( r > 0 \) indicate risk aversion. For subjects who switch from Option A to Option B a single time, these ranges are reported in Table 2. We discuss other cases in more detail below.

At the end of the experiment, subjects completed a survey that began with questions about demographic traits including age, sex, race, educational attainment, household income and household size. The survey included seven health-related questions: one each on cigarette smoking, height and weight (used to define body mass index), seat belt use, driving over the speed limit, and two questions on alcohol consumption. These questions are reprinted in Appendix B. With one exception (driving over the speed limit), they were adapted from the CDC’s Behavioral Risk Factor Surveillance System.

Bellemare and Shearer (2006) conducted the experiment using Canadian tree planters as subjects and reported that their subjects were generally more risk tolerant than the Holt and Laury subjects. Similarly, Elston et al. (2005) conducted the experiment at two small business conventions and reported that full-time entrepreneurs were significantly more risk tolerant than part-time entrepreneurs and non-entrepreneurs.

Lottery A, the safe choice, earned subjects either $10 or $8 and Lottery B, the risky choice, earned subjects either $19 or $1.00. Once all subjects completed and were paid for the lottery choice experiment they took part in a financial investment experiment that is the subject of a separate manuscript (Agnew et al., 2008).

The majority of survey questions dealt with subject experiences and attitudes about the financial investment experiment described in Agnew et al. (2008).
Table 2
Lottery choices and risk aversion

<table>
<thead>
<tr>
<th>Number of safe choices</th>
<th>Proportion of subjects</th>
<th>Range of relative risk aversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–1</td>
<td>0.02</td>
<td>$r &lt; -0.95$</td>
</tr>
<tr>
<td>2</td>
<td>0.03</td>
<td>$-0.95 &lt; r &lt; -0.49$</td>
</tr>
<tr>
<td>3</td>
<td>0.09</td>
<td>$-0.49 &lt; r &lt; -0.15$</td>
</tr>
<tr>
<td>4</td>
<td>0.23</td>
<td>$-0.15 &lt; r &lt; 0.15$</td>
</tr>
<tr>
<td>5</td>
<td>0.26</td>
<td>$0.15 &lt; r &lt; 0.41$</td>
</tr>
<tr>
<td>6</td>
<td>0.20</td>
<td>$0.41 &lt; r &lt; 0.68$</td>
</tr>
<tr>
<td>7</td>
<td>0.10</td>
<td>$0.68 &lt; r &lt; 0.97$</td>
</tr>
<tr>
<td>8</td>
<td>0.03</td>
<td>$0.97 &lt; r &lt; 1.37$</td>
</tr>
<tr>
<td>9–10</td>
<td>0.03</td>
<td>$1.37 &lt; r$</td>
</tr>
</tbody>
</table>

The behaviors measured in our survey represent some of the most significant and well-known behavioral influences on health status. Tobacco use, alcohol consumption, and behaviors tied to overweight and obesity are thought to explain almost 40% of U.S. deaths annually (e.g., Mokdad et al., 2004). Seat belt use has long been studied in the context of behavioral risks (e.g., Peltzman, 1975, and more recently Hakes and Viscusi, 2007) and is significantly associated with reductions in traffic fatalities (Department of Transportation, 1984). The evidence linking injuries with driving over posted speed limits is less clear cut, but some studies suggest that speeding is a contributing factor in nearly 30% of all fatal crashes (NHTSA, 1997). In the next section, we report results from the lottery choice experiment and from models of these behaviors that include the experimental measure of risk preference as an explanatory variable.

5. Estimation and results

Of the 1094 subjects who participated in the experiment, we excluded three subjects who left at least 1 of the 10 lottery choice decisions blank. Table 2 shows the distribution of the number of safe choices made by the remaining 1091 subjects, which appears very similar to that reported in other lottery choice experiments. Like those of other studies, our results also suggest a considerable amount of heterogeneity in risk preferences. The majority of subjects made either four (23%), five (26%) or six (20%) safe decisions. The comparable percentages reported in Holt and Laury (2002) are 26%, 26%, and 23%, and 24%, 12% and 24% in Lusk and Coble (2005). Fourteen percent of our subjects made three or fewer safe decisions; Holt and Laury (2002) and Lusk and Coble (2005) reported 8% and 12%, respectively, in this range.

The majority of our subjects (79%) started with Option A then switched from Option A to Option B once and played Option B thereafter. However, 21% “switched back” to the safe option after having chosen the risky option. This type of behavior is also reported in other lottery choice experiments. In Holt and Laury (2002), 13% of 212 subjects switched back to the safe option in an initial low-payoff treatment, and 7% switched back in a second low-payoff treatment. In Lusk and Coble (2005), 6% of 50 subjects did so. The difference in the percentage of such respondents may be attributable to the large fraction of non-students and older individuals in our subject pool. Like Holt and Laury (2002), we found that a large proportion (48%) of the subjects who switched back did so only once. The comparable percentage in their sample is higher, at around 75%.

For subjects who made multiple switches, we follow Harrison et al. (2007b) and Lusk and Coble (2005) in determining the range of values for relative risk aversion. The lower bound of the range is determined by the first switch a subject made from the safe lottery to the risky lottery. For example, if a subject chose Lottery A for the first four decisions then switched to Lottery B for the fifth decision, we use the lower bound associated with four safe choices, which is $-0.15$ (from Table 2). The upper bound is determined by the last safe choice a subject makes. Continuing with the example above, if this subject switched back to Lottery A for the sixth decision and then chose Lottery B for all remaining decisions, we use the upper bound of the range of relative risk aversion associated with six safe choices, which is 0.68 (from Table 2). As Harrison et al. (2007b) explain, this treats subjects as if they were indifferent between the options in the intermediate decisions and have “fat preferences.”

Forty-six subjects in our sample chose the safe option for Decision 10. Because a safe choice for the 10th decision means favoring a certain $6 over a certain $11.55, we interpret this as a sign the subject did not understand the instructions. These subjects are excluded from our subsequent analysis. This is similar to procedures described in Harrison et al. (2007b), which dropped 14 of 85 subjects who showed signs of confusion or lack of motivation.

Table 3 reports descriptive statistics for the explanatory variables defined from our survey questions. We exclude the three subjects who did not make all 10 pairwise lottery choice questions and the 46 subjects who chose the safe lottery in decision 10. This leaves us with 1045 observations; missing data on the other explanatory variables in our models reduces

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13 We found evidence consistent with this when we estimated a probit model in which the dependent variable equaled 1 if the subject switched back from risky to safe, and 0 otherwise. Age had a positive and significant coefficient and an indicator for current student had a significant negative coefficient. Also of interest is that indicators for the highest income and educational categories had negative and significant coefficients.

14 This number includes the 1.5% shown in Table 2 who made exactly 10 safe decisions, and other subjects who made risky decisions in prior rows but choose safe in Decision 10.
Table 3
Explanatory variable definitions, and sample means (n = 978)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRRA</td>
<td>Coefficient of relative risk aversion (see text for details)</td>
<td>0.257</td>
</tr>
<tr>
<td>Female</td>
<td>Equals 1 if subject is female; 0 otherwise</td>
<td>0.517</td>
</tr>
<tr>
<td>Age</td>
<td>Age at session, in years, calculated as session year minus birth year</td>
<td>45.35</td>
</tr>
<tr>
<td>Nonwhite</td>
<td>Equals 1 if subject is Black, Hispanic, Asian or another race; 0 if White</td>
<td>0.133</td>
</tr>
<tr>
<td>Current full time student</td>
<td>Equals 1 if subject reports employment status as full-time student; 0 otherwise</td>
<td>0.242</td>
</tr>
<tr>
<td>Some college</td>
<td>Equals 1 if highest level of education completed is some college, and subject is not a full time student; 0 otherwise</td>
<td>0.147</td>
</tr>
<tr>
<td>College degree</td>
<td>Equals 1 if highest level of education completed is college degree, and subject is not a full time student; 0 otherwise</td>
<td>0.261</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>Equals 1 if highest level of education completed is college degree, and subject is not a full time student; 0 otherwise</td>
<td>0.299</td>
</tr>
<tr>
<td>Household income $20–40k</td>
<td>Equals 1 if annual pre-tax household income is $20,000–40,000; 0 otherwise, including “no answer”</td>
<td>0.106</td>
</tr>
<tr>
<td>Household income $40–60k</td>
<td>Equals 1 if annual pre-tax household income is $40,001–60,000; 0 otherwise, including “no answer”</td>
<td>0.135</td>
</tr>
<tr>
<td>Household income $60–100k</td>
<td>Equals 1 if annual pre-tax household income is $60,001–100,000; 0 otherwise, including “no answer”</td>
<td>0.277</td>
</tr>
<tr>
<td>Household income &gt;$100k</td>
<td>Equals 1 if annual pre-tax household income is $100,000 or more; 0 otherwise, including “no answer”</td>
<td>0.307</td>
</tr>
<tr>
<td>Household income missing</td>
<td>Equals 1 if no income range was reported on household income question; 0 otherwise</td>
<td>0.094</td>
</tr>
<tr>
<td>Household size</td>
<td>Number of persons in household, including the subject</td>
<td>2.65</td>
</tr>
<tr>
<td>Catholic</td>
<td>Equals 1 if religious affiliation is Catholic; 0 otherwise</td>
<td>0.203</td>
</tr>
<tr>
<td>Protestant</td>
<td>Equals 1 if religious affiliation is Protestant; 0 otherwise</td>
<td>0.420</td>
</tr>
<tr>
<td>Other religion</td>
<td>Equals 1 if religious affiliation is Jewish, Muslim or other; 0 otherwise</td>
<td>0.172</td>
</tr>
<tr>
<td>Short-term time horizon</td>
<td>Equals 1 if most important time period in planning saving and spending is “next few months” or “next year”; 0 otherwise</td>
<td>0.160</td>
</tr>
<tr>
<td>Long-term time horizon</td>
<td>Equals 1 if most important time period in planning saving and spending is “longer than 10 years”; 0 otherwise</td>
<td>0.269</td>
</tr>
</tbody>
</table>

Table 4
Health behavior variable definitions, sample means, and correlations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Mean</th>
<th>Cigarette smoking</th>
<th>Heavy episodic drinking</th>
<th>Overweight/obese</th>
<th>Seat belt non-use</th>
<th>Driving over the speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarette smoking</td>
<td>Equals 1 if subject smokes cigarettes “every day” or “some days”; 0 if subject “never” smokes</td>
<td>0.081</td>
<td>(n = 977)</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy episodic drinking</td>
<td>Equals 1 if average drinks per day ≥4 for female subjects, ≥5 for male subjects; 0 otherwise</td>
<td>0.070</td>
<td>(n = 946)</td>
<td>0.511***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight/obese</td>
<td>Equals 1 if body mass index ≥25; 0 otherwise</td>
<td>0.468</td>
<td>(n = 885)</td>
<td>−0.128</td>
<td>−0.166*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Seat belt non-use</td>
<td>Equals 1 if subject wears seat belt “never,” “some of the time” or “most of the time”; 0 if “always” or almost always</td>
<td>0.101</td>
<td>(n = 978)</td>
<td>0.348***</td>
<td>0.151</td>
<td>−0.041</td>
<td>1.00</td>
</tr>
<tr>
<td>Driving over the speed limit</td>
<td>Equals 1 if subject drives over the speed limit “always” or almost always; 0 if “most” or “some of the time,” or “never”</td>
<td>0.092</td>
<td>(n = 971)</td>
<td>0.068</td>
<td>0.427***</td>
<td>−0.078</td>
<td>0.132</td>
</tr>
</tbody>
</table>

Notes: Statistical significance indicated by *0.10 and ***0.01 or better.

Our sample to a maximum of 978 observations, and missing data on the dependent variables (reported in Table 4) results in slightly smaller samples in our model estimations.

Our sample includes an almost even mix of males (48%) and females (52%). Subject age ranges from 18 to 87 years, and the average subject is 45 years old. About 13% of subjects are nonwhite; of these, the majority are African American. Our subject pool is highly educated. About one-fourth of the sample are current full-time students, another 30% hold graduate degrees and 26% have a college degree. Those whose highest level of education is high school or less comprise just over 5% of the
sample. The household income question was structured with categorical responses. About 10% of the sample did not provide an income range for this question so we construct a “missing” dummy variable so as not to lose these observations. All other income dummies are coded to 0 for these individuals. Household income is skewed toward the upper-end of the distribution, with 31% reporting annual household income greater than $100,000, and another 28% reporting income between $60,000 and $100,000. Those with the lowest income range, less than $20,000, represent just under 8% of the sample.

Table 4 reports the definitions and means of five variables capturing health-related behavioral risks for the sample of observations with non-missing data on the explanatory variables. About 8% of respondents reported that they smoked cigarettes every day or some days, and 7% had an episode of heavy drinking in the past week. Just under half of the sample was classified as overweight or obese, based on having a body mass index (BMI) greater than 25. About 10% of our sample reported they did not wear seat belts “always or almost always,” and 9% frequently drove over speed limits. Table 4 also reports pairwise correlation coefficients for these five variables: 6 of the 10 raw correlations are positive and 3 are statistically significant. Later in this section, we describe the results of a factor analysis of these outcome measures.

Compared to national averages, these risky behaviors are less common in our sample. Estimates from 2006 show that about 20% of U.S. adults were current smokers, 15% reported an episode of heavy drinking in the past month, and 62% were classified as overweight or obese (CDC, 2006). NHTSA (2006) reported nationwide seat belt non-use at 19%. There are several possible explanations for these differences. In the case of drinking, differences may be attributable to slight variations in the question wording (e.g., our question referenced the past week instead of the past month). Another is that our sample consists of a high proportion of highly educated individuals. However, educational differences do not account for this entirely, since even in our college-educated subsample we observe lower rates of smoking, drinking, and overweight/obesity compared to national estimates for this group (CDC, 2007). Another possibility is that the individuals who chose to participate in the experiment were different in some unobservable trait that is negatively correlated with these behaviors.

It is also possible that individuals underreported their behaviors on the survey. While we tried to minimize underreporting by using self-administered paper questionnaires that were not identified with personal data such as names or addresses, it is possible that subject responses were affected by social desirability bias. The fact that many responses were broadly defined may have limited the extent of this type of bias, although the downside to that is that we are unable to distinguish degrees of riskiness (such as those who drive 20 miles/h above the speed limit versus those who drive 5 miles/h over the limit). Although it is not possible to quantify the relative contributions of these factors or the degree of underreporting, measurement error in binary dependent variables is known to produce attenuated coefficient estimates (Hausman, 2001). In this case, our results would underestimate the true relationship between CRRA and behavioral health risks.

We next examine the association between these behavioral health risks and a measure of risk preference defined from our lottery choice experiment. We estimate separate probit models in which a binary indicator of each risky behavior is the dependent variable, and the main explanatory variable is the midpoint of the subject’s range of CRRA values (indicated in Table 5, we find that such an increase in risk aversion is associated with a 0.012 percentage point decline in the mean probability of smoking, or a 15.2% decline. The same increase in risk aversion is associated with an 8.9% decline in overweight/obesity, a 14.6% decline in seat belt non-use, and a statistically insignificant decline in speeding of 11.6%. The decline in heavy drinking associated with this change, though statistically significant, is infinitesimal (at 0.06%). Thus, in several cases the magnitude of the risk aversion effect is meaningfully large, albeit usually smaller than the marginal effect associated with being female or having a higher household income. We return to the relative contribution of the CRRA variable in Section 6.

The marginal effects of demographic controls are usually significant, and many have the expected sign. The marginal effect of the female indicator is negative in all models and significant in four of the five models (the exception is in the smoking...
Table 5
Models of specific health behaviors

<table>
<thead>
<tr>
<th>Explanatory variable</th>
<th>Cigarette smoking</th>
<th>Heavy episodic drinking</th>
<th>Overweight/obese</th>
<th>Seat belt non-use</th>
<th>Driving over the speed limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRRA</td>
<td>0.030* (1.87)</td>
<td>0.0001* (1.80)</td>
<td>0.102** (2.34)</td>
<td>0.036* (1.66)</td>
<td>0.026 (1.34)</td>
</tr>
<tr>
<td>Female</td>
<td>0.010 (0.75)</td>
<td>0.0001* (1.93)</td>
<td>0.278*** (7.60)</td>
<td>0.037** (2.02)</td>
<td>0.051*** (2.99)</td>
</tr>
<tr>
<td>Nonwhite</td>
<td>0.021 (1.03)</td>
<td>0.0001* (1.96)</td>
<td>0.046 (0.79)</td>
<td>0.037 (1.32)</td>
<td>0.003 (0.13)</td>
</tr>
<tr>
<td>Age</td>
<td>0.003** (3.41)</td>
<td>0.00003*** (4.49)</td>
<td>0.004** (2.60)</td>
<td>0.002 (0.24)</td>
<td>0.002** (3.48)</td>
</tr>
<tr>
<td>Some college</td>
<td>0.037* (1.78)</td>
<td>0.844*** (8.26)</td>
<td>0.061 (0.63)</td>
<td>0.036 (1.01)</td>
<td>0.080 (1.00)</td>
</tr>
<tr>
<td>College degree</td>
<td>0.048** (2.22)</td>
<td>0.094*** (7.00)</td>
<td>0.032 (0.34)</td>
<td>0.028 (0.76)</td>
<td>0.104 (1.34)</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>0.087*** (3.80)</td>
<td>0.038 (0.41)</td>
<td>0.056 (1.54)</td>
<td>0.128 (1.63)</td>
<td></td>
</tr>
<tr>
<td>Current full time student</td>
<td>0.071*** (4.48)</td>
<td>0.581*** (8.07)</td>
<td>0.280** (2.90)</td>
<td>0.003 (0.07)</td>
<td>0.084 (1.10)</td>
</tr>
<tr>
<td>Household income $20–40k</td>
<td>0.001 (0.04)</td>
<td>0.0001 (0.96)</td>
<td>0.060 (0.70)</td>
<td>0.039 (0.97)</td>
<td>0.039 (1.47)</td>
</tr>
<tr>
<td>Household income $40–60k</td>
<td>0.017 (0.71)</td>
<td>0.0001* (2.08)</td>
<td>0.056 (0.64)</td>
<td>0.010 (0.28)</td>
<td>0.054** (2.03)</td>
</tr>
<tr>
<td>Household income $60–100k</td>
<td>0.045** (2.06)</td>
<td>0.0001 (0.90)</td>
<td>0.011 (0.13)</td>
<td>0.062* (1.95)</td>
<td>0.063** (2.31)</td>
</tr>
<tr>
<td>Household income $100k+</td>
<td>0.008 (0.34)</td>
<td>0.0001 (0.75)</td>
<td>0.083 (0.99)</td>
<td>0.076* (2.39)</td>
<td>0.059** (2.16)</td>
</tr>
<tr>
<td>Household income missing</td>
<td>0.038* (1.69)</td>
<td>0.00003 (0.47)</td>
<td>0.140 (1.46)</td>
<td>0.047 (1.42)</td>
<td>0.041 (1.43)</td>
</tr>
<tr>
<td>Household size</td>
<td>0.002 (0.40)</td>
<td>0.00002 (1.07)</td>
<td>0.026 (1.46)</td>
<td>0.021** (2.63)</td>
<td>0.00006 (0.09)</td>
</tr>
<tr>
<td>Catholic</td>
<td>0.031* (1.87)</td>
<td>0.00002 (0.33)</td>
<td>0.063 (1.10)</td>
<td>0.005 (0.19)</td>
<td>0.008 (0.32)</td>
</tr>
<tr>
<td>Protestant</td>
<td>0.045*** (2.64)</td>
<td>0.0001* (1.75)</td>
<td>0.062 (1.23)</td>
<td>0.005 (0.19)</td>
<td>0.022 (1.05)</td>
</tr>
<tr>
<td>Other religion</td>
<td>0.014 (0.82)</td>
<td>0.0001* (2.12)</td>
<td>0.074 (1.23)</td>
<td>0.015 (0.57)</td>
<td>0.030 (1.30)</td>
</tr>
<tr>
<td>Short-term time horizon</td>
<td>0.016 (0.96)</td>
<td>0.00004 (0.85)</td>
<td>0.011 (0.20)</td>
<td>0.041 (1.61)</td>
<td>0.00004 (0.02)</td>
</tr>
<tr>
<td>Long-term time horizon</td>
<td>0.003 (0.16)</td>
<td>0.0001 (1.40)</td>
<td>0.026 (0.61)</td>
<td>0.005 (0.22)</td>
<td>0.005 (0.27)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>977</td>
<td>946</td>
<td>885</td>
<td>978</td>
<td>971</td>
</tr>
</tbody>
</table>

Dependent mean 0.081 0.070 0.468 0.101 0.092

Notes: Marginal effects from probit models reported, with absolute values of z-statistics in parentheses. Statistical significance indicated by *0.10, **0.05 and ***0.01 or better. In the model of heavy drinking, the indicator variables for college degree and graduate degree were combined because all subjects with a graduate degree had a value of 0 for the dependent variable. CRRA is the coefficient of relative risk aversion as defined in the text.

equation). This is consistent with prior evidence that binge drinking and overweight/obesity are more prevalent among men, and that women are more likely to wear seat belts (e.g., CDC, 2006; Hakes and Viscusi, 2007). Age has a negative and significant effect in models of smoking, heavy drinking and speeding, and a positive and significant effect on the probability of being overweight or obese. Education and income have mixed effects. Indicators for higher educational attainment have negative and significant marginal effects in the model of cigarette smoking, but positive and significant marginal effects in the model of heavy episodic drinking. The indicators for household income are usually negative but significant only in some models and for some ranges. Religious affiliation has negative and significant effects in the models of smoking and heavy drinking.

We next examine the association between the CRRA and three summary measures of risky behavior. The first is an indicator variable equal to one if the respondent engaged in any of the five behaviors, and 0 otherwise; the second is the number of five possible risky health behaviors. For the third measure, we use factor analysis to form a variable that can be interpreted as the underlying propensity to engage in these five behaviors. Specifically, we use the principal-factor method to identify a construct that explains a significant amount of variance in the five outcome measures. Because all five are binary, we use a tetrachoric correlation matrix to select factors.19 We extract the first principal factor and use predicted values of this as a dependent variable. The first principal factor was the only factor to have an eigenvalue greater than 1 (a commonly used criterion for determining the number of factors to extract), and four of the five variables loaded positively onto the first factor. Because the second principal factor had an eigenvalue of less than 0.3, and because only three variables had positive loadings on this second factor, we did not use it in our analysis.

The results of these three models are shown in Table 6. The top panel reports models in which all five behaviors were used in the construction of the dependent variables. The first column reports the marginal effect of CRRA in the probit of any risky behavior, the second column reports the CRRA coefficient from an ordered probit of the number of risky behaviors, and the third column reports the CRRA coefficient from an OLS regression of the first principal factor. All models also include the full set of explanatory variables shown in Table 5. In all three models, the coefficient or marginal effect of the CRRA variable has the expected negative sign. The effect is statistically significant at the 0.01 level in the first two models and significant at the 0.05 level in the third model. These results suggest that subjects who are more risk averse and have higher CRRA values are less likely to engage in any risky behavior, engage in fewer risky behaviors, and have lower estimated levels of the principal factor common to these five behaviors. These results offer additional support for the use of the experimental measure of risk preference in models of risky health behaviors.

We repeat the same exercise excluding the overweight/obesity variable from the summary measures. We do this because of the large number of non-responses to the weight question and the concern that this measure’s higher mean may be driving

19 For this exercise we estimated the correlation matrix using casewise deletion; thus, the correlation coefficients differ slightly from those presented in Table 3.
Table 6
Alternate model specifications using summary measures of risk behavior

<table>
<thead>
<tr>
<th>Panel A: All five behaviors used to construct dependent variables</th>
<th>Dependent variable</th>
<th>Number of risky behaviors (ordered probit coefficients reported)</th>
<th>Principal factor obtained from factor analysis (OLS coefficients reported)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRRA</td>
<td>−0.124*** (3.09)</td>
<td>−0.349*** (3.70)</td>
<td>−0.029** (2.01)</td>
</tr>
<tr>
<td>Dependent Mean</td>
<td>0.640</td>
<td>0.819</td>
<td>0.054</td>
</tr>
<tr>
<td>Sample size</td>
<td>889</td>
<td>853</td>
<td>853</td>
</tr>
</tbody>
</table>

Panel B: Overweight/obese indicator omitted in construction of dependent variables

| CRRA                                                          | −0.078** (2.21)  | −0.296*** (2.67)                                 | −0.034*** (2.47)                                 |
| Dependent Mean                                                | 0.266             | 0.338                                           | 0.090                                           |
| Sample size                                                   | 952               | 938                                             | 938                                             |

Notes: All models also include all of the explanatory variables shown in Table 5. Absolute values of z-statistics are shown in parentheses. Statistical significance indicated by *0.10, **0.05 and ***0.01 or better. CRRA is the coefficient of relative risk aversion as defined in the text.

the results, and because the obese/overweight indicator loaded negatively onto the first principal factor. These results are presented in the bottom panel of Table 6, and are similar in terms of the sign and statistical significance of the CRRA's marginal effect or coefficient.

We next examine the sensitivity of our results to changes in the explanatory variables included in the model, changes in the dependent variable construction, and changes in the sample. In some cases our results were robust to these changes. For example, when we re-estimated models by dropping the controls for religious affiliation and financial planning time horizons, we obtained statistically significant results for the CRRA variable in all of the models shown in Tables 5 and 6 except two—the speeding model, where the effect of the CRRA was not significant in the first place, and the heavy drinking model, where the marginal effect lost its significance. Because religious affiliation had a significant effect on heavy drinking, we view the Table 5 version as the preferred specification. When we re-estimated models adding controls for marital status, we obtained results for the CRRA similar to those shown in Tables 5 and 6 in terms of sign and significance, with one exception—the statistical significance of CRRA in the smoking model rose to the 0.05 level.

Our results are also largely robust to changes in the sample that exclude some subjects who switched back and forth from the risky option to the safe option multiple times. As noted above, about one-fifth of our subjects switched back to the safe choice of Lottery A after having made the initial switch to Lottery B in an earlier row. This type of subject behavior is common in variations of the lottery choice experiment, and we followed the previous literature in dealing with these subjects. That said, the percentage of subjects who switched back is somewhat higher in our study, and of this group, a higher percentage switched back more than once. This raises questions about how well these subjects comprehended the task and how seriously they took it. To examine the influence of these subjects on our results, we re-estimated our models by excluding first, the roughly 4% of the sample who switched back more than twice, and then the roughly 10% who switched back more than once. For all models using summary measures as dependent variables, the results using these two alternate samples were qualitatively similar to those shown in Table 6 in terms of the sign and significance of the CRRA effect. For the individual behavior models, excluding subjects who switched back more than once led to a loss of statistical significance for the CRRA only in the model of seat belt non-use; the statistical significance of CRRA was intact in the models of smoking, drinking and overweight/obese. The CRRA coefficient was negative and significant in the models of smoking, drinking, overweight/obese, and seat belt non-use when subjects who switched back more than twice were excluded.

However, the results in Table 5 are sensitive to changes in the way risk behaviors are defined from the survey questions shown in Appendix B. For example, we examined what happened to the main results if smoking was re-defined as equal to 1 only when the subject reported smoking “every day” (as opposed to “every day” or “most days” in Table 5 model). For seat belt non-use, we constructed an alternate measure equal to 1 if the subject reported wearing a belt only “some of the time” or “never” (as opposed to any frequency other than “always” in Table 5 model). Table 7 reports alternate definitions of all five risk behavior variables, their means, and the effects of the CRRA variable in models of the behaviors. In most cases, such as the alternate models of seat belt non-use and smoking, the CRRA variable still had a negative effect, but the effect was not significant. In two cases the marginal effect of the CRRA variable was positive but insignificant. This was the case when the dependent variable was defined as 1 if the individual was obese and 0 otherwise, and when
heavy drinking was defined as having more than one drink per day for females (two for males) every day during the past week.\textsuperscript{20}

In spite of these findings, we prefer the specifications shown in Table 5 for two reasons. The first is that the original dependent variable definitions are closer to the definitions used in other studies (e.g., Hakes and Viscusi, 2007; CDC, 2006). The second is that, in most cases, the alternate definitions resulted in dependent variables with very low means. Specifically, dependent variable definitions are closer to the definitions used in other studies (e.g., Hakes and Viscusi, 2007; CDC, 2006).

Survey questions on respondents' actual behaviors, hypothetical behaviors, and attitudes have been used in many empirical studies of health-related behaviors to control for individual risk preference. AsDave and Saffer (2007) explain, trust, and other-regarding behavior (e.g., Glaeser et al., 2000; Anderson et al., 2004). Because subjects are paid based on the decisions they make, experiments provide incentive-compatible measures.

In this paper, we examine how well an experiment-based measure of risk preference predicts several health-related behaviors. We find that risk aversion as measured by subject choices in the Holt and Laury (2002) lottery choice experiment is negatively and significantly associated with cigarette smoking, heavy drinking, being overweight or obese, and seat belt non-use, and with several summary measures of risky behavior. These results suggest that risk-taking is consistent across these multiple behaviors, both when small monetary amounts are at stake, and when the stakes include consequences for one's health. These findings can be interpreted as additional evidence that risky health behaviors are influenced in a consistent manner by this preference trait. In this regard, our findings build on earlier research by Viscusi and Hersch (2001), Hersh and Viscusi (1998) and Hakes and Viscusi (2007).

Our results offer some guidance in the choice of proxy measures employed in prior studies. While a complete assessment of the relative merits of all risk preference proxies is not possible with our data, our work does show that two actual behaviors commonly used as risk preference proxies are significantly related to our experimental measure of risk preference. That is,

\textsuperscript{20} The USDA defines moderate drinking as the consumption of up to one drink per day for women and up to two drinks per day for men (USDA, 2005).

\textsuperscript{21} In one case the re-defined variable had a higher mean: 35% of subjects reported driving over the speed limit all or most of the time, while only 9% reported speeding all the time (the construction used in Table 5). Regardless of how speeding was defined, the CRRA marginal effect was not statistically significant. In another case the redefined dependent variable was the body mass index, a continuous measure. In this case the CRRA had a negative and significant effect.
we find that individuals with higher levels of risk aversion in the experiment were less likely to smoke cigarettes and less likely to forego the use of a seat belt. As such our findings validate the use of these measures in future research.

In addition, our results have implications for both experimental economics and research based on household surveys. Our work adds to a growing number of studies on the external validity of laboratory experiments. One approach to validation is to examine whether field experiments can replicate results within a naturally occurring environment (e.g., List, 2006). For example, Harrison et al. (2007b) conducted a lottery choice experiment using coin dealers as subjects and rare coins as prizes, and found that field results validated lab results when there was minimal uncertainty about the value of the prize. Broadly speaking, field experiments often but not always validate findings from laboratory experiments. Our study takes another approach to the external validation of laboratory experiments by pairing an experimental measure of risk preference with “real-world” behaviors. Building on evidence provided by Lusk and Coble (2005), which showed that lottery choice-based risk preference predicted demand for genetically modified food, we find that the same experimental measure predicts several risky health behaviors. Our survey does not allow us to examine the association between experimental measures and preventive health behaviors (such as flu shots and cancer screening activities), and it would be interesting to examine these behaviors in future research.

Our results also contribute to an emerging discussion on the merits of pairing large household surveys with experimental economics pilots that elicit incentive-compatible measures of attitudes. The Dohmen et al. (2005) study described earlier is one such example; another is Hammoudi and Thomas (2006), which recruited several hundred rural respondents to the 2002 Mexican Family Life Survey to participate in a series of economics experiments measuring preferences. They reported that experimental measures of risk preferences and intertemporal choice were sometimes correlated with behaviors in ways predicted by theory. Their work is part of a larger project on the merits of integrating experiments into existing household surveys funded by the National Institutes of Health. Related projects have been funded by the National Science Foundation and private foundations.

The results presented here suggest that there are benefits to incorporating experiments into surveys. The results from significance tests of the CRRA variable suggest that the addition of this measure increases the explanatory power of most of the models reported in Tables 5 and 6 (the exception is speeding). Of course this gain in predictive power is not costless. Across all of our sessions, subjects received average earnings of $7 in the lottery choice experiment, making the total earnings paid just over $7500. For surveys in which an interviewer assists in the completion of the survey in the presence of the respondent, adding the lottery choice experiment would involve a small increase in survey time, which we estimate to be approximately 15 minutes per subject.

Clearly many issues remain regarding the costs of adding experiments to national surveys that are conducted by mail or phone, the challenges more representative samples may face in completing such a task, and the merits of the experimental measure relative to its alternatives. For example, adding an indicator variable for smoking also increased the explanatory power of models of seat belt non-use and heavy drinking according to results of \( t \)-tests. Interestingly, the effects of seat belt non-use or smoking were sometimes statistically insignificant in models of other risk behaviors. Smoking had an insignificant effect in models of speeding and overweight, and seat belt non-use had an insignificant effect in models of drinking, speeding, and overweight. Thus, our findings suggest that there may be additional benefits from using an experimental measure of risk preference to predict certain health-related behaviors.

Acknowledgments

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Appendix A. Experiment Instructions (from http://veconlab.econ.virginia.edu/admin.htm)

Instructions
ID number:

You will be making choices between two lotteries, such as those represented as “Option A” and “Option B” below. The money prizes are determined by throwing a 10-sided die. Each outcome, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, is equally likely. Thus, if you choose Option A, you will have a 1 in 10 chance of earning $6.00 and a 9 in 10 chance of earning $4.80. Similarly, Option B offers a 1 in 10 chance of earning $11.55 and a 9 in 10 chance of earning $0.30.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>Your choice (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>$6.00 if the die is 1; $4.80 if the die is 2–10</td>
<td>$11.55 if the die is 1; $0.30 if the die is 2–10</td>
<td>A or B</td>
</tr>
</tbody>
</table>

Each row of the decision table contains a pair of choices between Option A and Option B.
You make your choice by circling either “A” or “B” in the far right hand column of the table. Only one option in each row (i.e. for each Decision) can be circled.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>Your choice (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>$6.00 if the die is 1; $4.80 if the die is 2–10</td>
<td>$11.55 if the die is 1; $0.30 if the die is 2–10</td>
<td>A or B</td>
</tr>
<tr>
<td>2nd</td>
<td>$6.00 if the die is 1–2; $4.80 if the die is 3–10</td>
<td>$11.55 if the die is 1–2; $0.30 if the die is 3–10</td>
<td>A or B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Even though you will make 10 decisions, only one of these will end up being used. The selection of the one to be used depends on the throw of a 10-sided die. No decision is any more likely to be used than any other, and you will not know in advance which one will be selected, so please think about each one carefully. The first throw of the 10-sided die fixes the row (i.e. the Decision) that will be used to determine your earnings. For example, suppose that you make all 10 decisions and the throw of the die is 9, then your choice, A or B, for decision 9 below would be used and the other decisions would not be used.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>Your choice (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>$6.00 if the die is 1–9; $4.80 if the die is 10</td>
<td>$11.55 if the die is 1–9; $0.30 if the die is 10</td>
<td>A or B</td>
</tr>
<tr>
<td>10th</td>
<td>$6.00 if the die is 1–10</td>
<td>$11.55 if the die is 1–10</td>
<td>A or B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After the random die throw fixes the Decision row that will be used, we need to make a second die throw to determine the earnings for the Option you chose for that row. In Decision 9 below, for example, a throw of 1, 2, 3, 4, 5, 6, 7, 8, or 9 will result in the higher payoff for the option you chose, and a throw of 10 will result in the lower payoff.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>Your choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>$6.00 if the die is 1–9; $4.80 if the die is 10</td>
<td>$11.55 if the die is 1–9; $0.30 if the die is 10</td>
<td>A or B</td>
</tr>
<tr>
<td>10th</td>
<td>$6.00 if the die is 1–10</td>
<td>$11.55 if the die is 1–10</td>
<td>A or B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For decision 10, the random die throw will not be needed, since the choice is between amounts of money that are fixed: $6.00 for Option A and $11.55 for Option B.

Making 10 decisions: At the end of these instructions you will see a table with 10 decisions in 10 separate rows, and you choose by circling one choice (A or B) in the far right hand column for each of the 10 rows. You may make these choices in any order.

The relevant decision: One of the rows (i.e. Decisions) is then selected at random, and the Option (A or B) that you chose in that row will be used to determine your earnings. Note: Please think about each decision carefully, since each row is equally likely to end up being the one that is used to determine payoffs.

Determining the payoff: After one of the decisions has been randomly selected, we will throw the 10-sided die a second time. The number is equally likely to be 1, 2, 3, . . . , 10. This number determines your earnings for the Option (A or B) that you previously selected for the decision being used.

Instructions summary:

To summarize, you will indicate an option, A or B, for each of the rows by circling one choice in the far right hand column. Then the throw of a 10-sided die fixes which row of the table (i.e. which Decision) is relevant for your earnings. In that row, your decision fixed the choice for that row, Option A or Option B, and a final throw of the 10-sided die will determine the money payoff for the decision you made.

<table>
<thead>
<tr>
<th>Decision</th>
<th>Option A</th>
<th>Option B</th>
<th>Your decision (circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$6.00 if the die is 1; $4.80 if the die is 2–10</td>
<td>$11.55 if the die is 1; $0.30 if the die is 2–10</td>
<td>A or B</td>
</tr>
<tr>
<td>2</td>
<td>$6.00 if the die is 1–2; $4.80 if the die is 3–10</td>
<td>$11.55 if the die is 1–2; $0.30 if the die is 3–10</td>
<td>A or B</td>
</tr>
<tr>
<td>3</td>
<td>$6.00 if the die is 1–3; $4.80 if the die is 4–10</td>
<td>$11.55 if the die is 1–3; $0.30 if the die is 4–10</td>
<td>A or B</td>
</tr>
<tr>
<td>4</td>
<td>$6.00 if the die is 1–4; $4.80 if the die is 5–10</td>
<td>$11.55 if the die is 1–4; $0.30 if the die is 5–10</td>
<td>A or B</td>
</tr>
<tr>
<td>5</td>
<td>$6.00 if the die is 1–5; $4.80 if the die is 6–10</td>
<td>$11.55 if the die is 1–5; $0.30 if the die is 6–10</td>
<td>A or B</td>
</tr>
<tr>
<td>6</td>
<td>$6.00 if the die is 1–6; $4.80 if the die is 7–10</td>
<td>$11.55 if the die is 1–6; $0.30 if the die is 7–10</td>
<td>A or B</td>
</tr>
<tr>
<td>7</td>
<td>$6.00 if the die is 1–7; $4.80 if the die is 8–10</td>
<td>$11.55 if the die is 1–7; $0.30 if the die is 8–10</td>
<td>A or B</td>
</tr>
<tr>
<td>8</td>
<td>$6.00 if the die is 1–8; $4.80 if the die is 9–10</td>
<td>$11.55 if the die is 1–8; $0.30 if the die is 9–10</td>
<td>A or B</td>
</tr>
<tr>
<td>9</td>
<td>$6.00 if the die is 1–9; $4.80 if the die is 10</td>
<td>$11.55 if the die is 1–9; $0.30 if the die is 10</td>
<td>A or B</td>
</tr>
<tr>
<td>10</td>
<td>$6.00 if the die is 1–10</td>
<td>$11.55 if the die is 1–10</td>
<td>A or B</td>
</tr>
</tbody>
</table>

Result of first die throw (to determine Decision): __________. Result of second die throw (to determine payoff): __________. Payoff: __________.
Appendix B. Survey questions on health-related behaviors

How often do you wear a seatbelt when driving or riding in a car?

- Always, or almost always
- Most of the time
- Some of the time
- Never, or almost never

If you drive a car, how often do you drive over the speed limit?

- Always, or almost always
- Most of the time
- Some of the time
- Never, or almost never
- Not Applicable; I don't drive a car

Do you now smoke cigarettes every day, some days, or not at all?

- Every day
- Some days
- Not at all
- I prefer not to answer this question.

A drink of alcohol is 1 can or bottle of beer, 1 glass of wine, 1 can or bottle of wine cooler, 1 cocktail, or 1 shot of liquor. During the past week, how many days did you have at least one drink of any alcoholic beverage?

- (insert number)
- I prefer not to answer this question.

On the days when you drank, about how many drinks did you drink on average?

- (insert number)
- I prefer not to answer this question.

About how much do you weigh in pounds?

- (insert number)
- I prefer not to answer this question.

For your height, please enter two numbers, feet in the first box and inches in the second box. For example, a 5 foot 7 inch tall person would put a 5 for the first height question and a 7 for the second.

About how tall are you IN FEET?

- (insert number)
- I prefer not to answer this question

About how tall are you IN INCHES?

- (insert number)
- I prefer not to answer this question

References


