Games of strategy in culture and economics research

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Abstract

Games are meant to be fun, yet economists have successfully developed games that are less fun and less understood by participants especially in developing countries. This paper surveys failures in risk attitudes elicitation in sub-Saharan Africa (SSA) and questions the use of complex research tools such as multiple price list (MPL) approaches and behavioral games that rural participants have never played before. The failures can be avoided by using innovative research tools that ingest local activities like indigenous board games that the rural people have played for generations because these games are entertaining and closely related to the economic decisions they make. In the case of Malawi and other African countries, bawo-an indigenous board game- is the most common of these games and relates to every day economic decision making. I provide a description of the game and suggest a research agenda that applies the game in economics research-for risk attitudes elicitation, improving math skills of children and behavioral game theory.

JEL Codes: Z13, D91

1. Introduction

Beginning with the first field experiment for eliciting risk preferences- an incentive-compatible design by Hans Binswanger (1980, 1981), economists have thereafter developed several complex methods to understand how poor rural farmers make economic choices under risky conditions. The commonly used methods are experimental lotteries modified from the multiple price list (MPL) procedure of Holt and Laury (2002) (here after H&L) and the prospect theory parameters' elicitation procedure of Tanaka, Camerer and Nguyen (2010). These methods have failed in rural and poor settings where most people have limited education and formal numerical skills (Jacobson and Petrie 2009; Holden, 2014; Charness and Viceisza, 2016). This failure is

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exemplified in the percentage of participants who make inconsistent choices- by switching more than once from one option to another when provided with ordered lists. In Rwanda, for example, Jacobson and Petrie (2009) find over 50 percent inconsistent choices. Charness and Viceisza (2016) find about 51 percent inconsistencies in Senegal. Notwithstanding lack of numerical skills being the usual culprit, this problem is beyond numeracy. It is a problem of lack of familiarity with the type of games and lotteries used. Even in H&L's original experiment, 5.5-10 percent of the participants (educated U.S participants) made inconsistent choices across the various experiments.

This paper surveys failures in risk attitudes elicitation in developing countries and questions the use of conventional and complex research tools such as multiple price list (MPL) procedures. To improve the accuracy of risk preference elicitation, I propose a new approach that relies on using indigenous board games like bawo (see figure 1) in the case of African countries. Sanderson (1913) provides a list of other indigenous board games played by different tribes in Malawi while Murray (1952) and Townshend (1979) provide comprehensive account of all mancala games played in Africa. This new approach is premised on several factors; (i) mancala games are generally fun therefore if included as part of a field experiment one is likely to get participants excited about the research process, and (ii) the vocabulary and rules of the games are similar to expressions rural people use to explain or enforce particular norms thereby allowing a direct link between game decisions and real life decisions. For example, a leading game anthropologist, Philip Townshend, describes the "Swahili" ethic as consistent with the plays and strategies in a mancala game called bao/bawo:

"The ethic implicit in bao is one of respect for deservedly and legitimately earned power, but equally of avoidance of the abusing this power, which is seen not only as a privilege but at the same time as a responsibility, neglect of which leads to its forfeiture. Certain personal qualities are esteemed, in particular "involving oneself ... in certain financial commitments to the community and showing business acumen and an understanding of the importance of the long term in financial matters." Townshend (1982, p.190)

This feature is unlike in any other lotteries or tournament games. Mancala board games therefore act as catalysts for heuristics for decision making in real life. This idea follows from Simon's (1955) research program on procedural and bounded rationality in which given their

complexity, combinatorial tasks such as board games offer an ideal environment for exploring human bounded rationality (Gobet, de Voogt and Retschitzki 2004).

To demonstrate my proposed approach, I use one variant of mancala games called bawo, a board game played in Malawi and other parts of Eastern Africa including Tanzania and Kenya. According to anthropological research reported in Kyule (2016), the oldest known surviving wooden bawo game board was made in 1896 in Malawi and is kept in the British Museum in London. The game is believed to be indigenous in Africa and traces of its existence have been reported by European explorers as back as sixteenth century and archeological evidence of bawo dating as back as 3500 years ago (Kyule 2016, Townshend 1979). Bawo requires complex strategic reasoning both in terms of what the incentives and opportunities others have as well as their capabilities. According to De Voogt (2002), bawo positions are more volatile than positions in chess or any other game that has been subject to psychological investigation. Though anthropologists and historians have studied the importance of bawo in the lives of traditional African societies (Townshend 1979), there is no research on its continued relevance in people's modern economics, politics, culture and society (Kyule, 2016).

This paper builds on limited prior literature on using board games and other arts in measuring economic variables e.g., subjective probabilities and risk attitudes or improving certain economic outcomes e.g., math learning among children. For example, in Brazil, Ferrara et al (2012) finds a positive effect of watching soap operas on fertility. In Nigeria, using entertainment education television series led to improvements in knowledge and attitudes toward HIV in Nigeria (Banerjee et al. 2018). Another example is from Uganda where those who were randomly selected to watch "Queen of Katwe" movie had higher mathematics pass rates in national secondary school exams (Riley 2018). In India, Meinzen-Dick et al. (2018) used collective action games for groundwater management.

Delavande and Kohler (2007) and Delavande and Kohler (2016) developed an interactive elicitation methodology-using board game- for collecting probabilistic expectations about HIV/AIDS issues in a developing country context (rural Malawi) -with low levels of literacy and numeracy among respondents. They used bawo as a reference game for people to reveal the subjective expectations of an event occurring. Specifically, the interviewers gave the following survey instructions to the interviewees: *"Imagine that we are playing bawo. Say, when asked*

about the chance that you will win, you put 7 beans in the plate. This means that you believe you would win 7 out of 10 games on average if we play for a long time." These instructions were then followed by a substantive question e.g., about the likelihood of a new born baby dying before his/her first birthday. This simple and innovative reference to bawo has led to a growing literature that has used the survey data to assess the effects of probabilistic expectations on risky behaviors (see a review of these studies by Delavande, Gine and McKenzie 2011).

In a related use of bawo, the game has been used to elicit farmer preferences for agricultural technologies particularly tree species for agroforestry firstly by Franzel (2000) and later adapted by Kuntashula and Mafongoya (2005) and Roothaert and Franzel (2001). Franzel (2000) deployed the game in Kenya and Burundi comparing it to conventional scoring exercises using questionnaires and participatory research tools like matrix ranking. The farmers were asked to score agroforestry technologies using seeds on the bawo board in which well performing technologies were given five seeds while poorly performing technologies were given one seed. According to Franzel (2000), using bawo allowed the researchers to obtain quantitative data used for statistical analysis while at the same time having a data collection process that is participatory and entertaining.

Beyond contributing to this emerging literature, this paper makes two fundamental arguments for importance of context in the implementation of risk attitudes elicitation field experiments. The first is that the errors that occur because of misunderstandings given the unfamiliarity of experimental games may be reduced by using familiar games thereby improving the research process while at the same time reducing boredom of rural people as they participate in the increasing number of unexciting experimental games. Few recent studies (e.g., Doerr et al 2013 and Cassar, Healy and Kessler 2017) have already found that using visual or graphical instruments as compared to tabular or textual instruments reduces inconsistencies. Contextual instructions have also been found to be better than abstract instructions in field experiments (Alekseev, Charness, Gneezy 2017).

The second point is that economics as a field has overly relied on introducing new technologies and social processes to developing countries or transferring these from one developing country to another (usually using a catch phrase of "what works in …"); less on interventions that start from the premise of what is already available in these communities. This

is problematic because it is based on faulty assumption of scientific merit of games the researchers are familiar with but considers any other games familiar to participants in developing countries as either unrelated to economics or embedding some cultural aspects that reduces the credibility of the research. To the contrary, games of strategy remain an integral part of the daily economic lives of the people as such should be the main tool for research.

In the next section, I present a review of the recent evidence on risk attitudes elicitation in Africa. I then discuss the rules of the game and some strategies that winning players use. These are presented for the reader to appreciate the importance of the decisions in the game and every day decisions that people make in rural areas. Then, I present modifications of research designs in risk elicitation field experiments and RCTs in improving math skills. I also discuss potential applications of games of strategy in culture in behavioral game theory, economic history, and analysis of institutions. Finally, I present concluding remarks and limitations of the proposed approach.

2. Risk Preference Elicitation Failures in Africa

In this section, I review the evidence on the inconsistences in risk elicitation methods. I then offer alternative methods that can improve the understanding of risk attitudes in these environments. Table 1 shows the main studies on risk elicitation that use variants of the multiple price list approach of H&L, the extent of risk elicitation inconsistencies and how inconsistences were resolved. Overall, the inconsistencies range from 0 (for cases where participants with inconsistences are kicked out or enforced to make consistent choices) to 55 percent. Table 1 column 5 lists several ways that have been suggested to reduce inconsistencies. These can be categorized into five broad categories: (i) more time and pretesting of instruments, (ii) enforcement of consistency, (iii) research design for understanding inconsistencies, (iv) fixed probabilities with varying outcomes, and (v) alternative approaches. Firstly, researchers must allow enough time for the players to understand the experiments including also giving to play a practice game before starting the experiment (Tanaka and Munro, 2014). This is standard recommendation for any type of field research but it experimental games requires even more time because people are not just recalling stuff as in surveys but also making strategic future decisions. Second strategy is to enforce consistency of choices as in Holden (2014) and Holden

and Quiggin (2018). This practice is nonetheless suboptimal as it avoids the actual problem and imposes unrealistic theoretical behavior. Jacobson and Petrie (2009) also argued that forced consistency may hide preferences and behavioral biases which are important to truly understand behavior.

The third strategy is to allow inconsistencies and use them in explaining behavior. Several studies including Jacobson and Petrie (2009) have argued that those making inconsistent choices are not a random set of participants. Thus, it is important to understand the behavioral information that is embedded in these inconsistencies. The fourth strategy is to vary outcomes and keep probabilities fixed. This strategy has the added advantage of identifying all components of risk preferences (i.e., shape of the probability weighting function and shape of the utility) unlike the H&L method which elicits only shape of the probability weighting function (Drichoutis and Lusk 2017).

The fifth strategy may be to abandon these experimental lotteries and use different methods altogether if the context allows. For instance, several studies have found evidence that simple surveys predict risk behavior better than risk attitudes experiments (see for example Chuang and Schechter 2015; Charness and Viceisza 2013). Nonetheless, the alternative methods (e.g., household survey questions) also have their own caveats that researchers must deal with. For example, Vieider et al (2015) elicit risk attitudes in Ethiopia using certainty equivalents instead of H&L method. While this reduced multiple switching to as low as 0.6 percent of the sample, about 38 percent of the subjects violated stochastic dominance at least once. This type of a hot debate (see Sanou et al 2017 for a review of this debate) can be resolved if certain aspects of these methods e.g., which games to play or what mode of economic value to use-are well designed.

Based on the failures and strategies for dealing with them, I suggest that the ideal experimental design should always be a double experimentation- in which a randomized control experiment is conducted with one group doing one set of field experiments (e.g., using indigenous games) while another group does another set of field experiments or surveys using other methods. In addition, it should be standard to compare risk taking behavior in the lab-in-field experiments to actual risky decisions people make.

Table 1: Risk elicitation studies in sub-Saharan Africa and approaches to dealing with inconsistencies

Studies	Country	Risk elicitation methods	Percentage of inconsistencies	Suggested solutions
Brauw and Eozenou (2014)	Mozambique	Modified H&L	0.14	Use of hypothetical rainfall scenarios and familiar crop
Holden and Quiggin (2018)	Malawi	H&L and Tanaka *et al* (2010)	0	Restricted respondents not to switch
Charness and Viceisza (2016)	Senegal	H&L	52	Designed to identify the inconsistencies
Sanou, Liverpool-Tasie, and Shupp (2016)	Niger	H&L compared to Likert style questions	0	Subjects choosing between a fixed lottery and a changing safe payoff as also suggested by Charness and Viceisza (2016)
Jacobson and Petrie (2009)	Rwanda	H&L designed to detect mistakes	55	Used the mistakes to explain behavior
Brick, Visser and Burns (2012)	South Africa	Modified H&L	41	Fixed probabilities at 100% and 50% and varied the incentives
Ihli *et al* (2016)	Uganda	H&L	5.7	Visual display of bags with balls of different colors numbered by the incentives for the game.
Tanaka and Munro (2014)	Uganda	H&L	3.6	Simplified the notion of probabilities using four balls numbered from one to four. Each ball carried a probability of 25%

Notes: The papers listed were based on a search of African country names in the citations of H&L and Tanaka *et al* (2010) papers on google scholar. The papers are also the most recent (2009-2018).

3. Games of Strategy in Culture: Language and Rules

It is important to reiterate that I premise the use of games of strategy in economics on the theoretical links between language, rules of the game[1] and everyday decision making of people who play the game. An important observation is that the vocabulary used in the game of bawo is the same as the vocabulary used by farmers when describing farm production and marketing decisions. This may seem to be just a coincidence, but I argue that since the game has been

played for centuries, its language has evolved with the economic decision making of the people in fundamental ways. This observation does not have empirical facts yet; this paper calls for research that looks seriously at fundamental aspects of indigenous board game culture and language that have survived over centuries in public policy analysis.

A mancala game is a social game. The game is usually watched by other players who expect to play against the winner, who make suggestions about the moves, tell stories and make jokes that may infuriate or excite the two players playing the game. The player who beats them all is considered to have a superior mastery of the game and can get some prestige and respect in the community out of it. It is an empirical question whether some village leaders are chosen based on their performance in the game though this has been widely reported by anthropologists (Townshend 1979).

3.1 Language

Philosophers were the first to formally study language characteristics and relate it to language of games. The well-known work in this area of study was by Ludwig Wittgenstein, *Philosophical investigations* which introduced a notion of language games. Philosophers in SSA (e.g., Kaiyange 2014) have also investigated how proverb's meaning depends on context. The analysis of how a language may be used as a medium to understand the link between decisions in games and in real life is not just of philosophical importance. Language characteristics (e.g., through proverbs) remain important sources of information about economic decision making that economists have not yet infused in standard economic theories. I must be cautious here and acknowledge that there are several prior studies in the economics of language[2] that compare the characteristics of different languages and the correlations with economic outcomes. For example, Chen (2013) associates how languages encode time and several economic variables including savings rates, health behaviors and retirement assets. Two recent papers by Rao (2016) and Jakiela and Ozier (2017) investigate how the gendered classification of nouns in languages affects women's labor force participation. Albeit these studies, the relationship between characteristics of a language and economic outcomes has rarely been investigated in development economics yet in most developing countries especially in Africa, the multiplicity of languages and transmission of most knowledge across generations and spaces is through spoken languages.

The terminology used in bawo is symbolic of every day actions. First, just as farming, players in the game of bawo start with sowing seeds which in one of the languages, Chewa, is *kudzala* (Sowing the seeds called *nkhomo*). A well-planned game depends on how the players have planted the seeds. The anthropological, historical and bawo game literature does not mention anything about the word *"kudzala"* as part of the bawo terminology though they mention of sowing seeds. This is a case of improvisation in which bawo players adopted into bawo a terminology commonly associated with farming (*kudzala*). One of the common norms when playing the game is that one can sow once only. It is not yet known whether this affects farmers' norms in replanting crops.

The second term used in bawo is *kutakata* meaning playing without reaping the benefits immediately but with a plan to consume in the next phase of play. Malawians use this word in everyday life to refer to doing several activities with the hope that one of them will eventually pay off. The word is also used when someone is working hard to make a good life for him/herself even though the benefits don't seem to be immediate.

The third word is *kudya* (eat) which is used in the game when taking the opponent's seeds. One of the rules of the game is that when you have a chance to eat you are not allowed to play a move that will not eat (*kutakata*).

The fourth word is *ntaji* (a play to eat). This is a start of a consuming process of opponent's seeds. Whenever you have an opportunity to eat (a *ntaji*), you are not allowed to make a play that doesn't eat immediately. Rural Malawians use an expression *"osamatakata ntaji ulipo"* meaning in life you should always use the opportunities as fast as possible or literally don't work on something without benefits when you have a chance to do what is beneficial. This expression is also commonly used in market bargaining in which either the buyer or seller tries to convince the other party to sell or to buy by expressing the bawo rule that when you have a *"ntaji"* you are not allowed to *"takata"*.

The fifth word is *nyumba* (house) which refers to the fourth pocket from the right of each player. It is also called *kuo* (heap) and *kuu*/*mudzi* (village). One has throughout the game, the chance to move the house or stay. An interesting research hypothesis would be that players who avoid moving the house in bawo may also be averse to migrating to urban areas or abroad in their own lives.

The sixth and final term is *kugoma* (stop of play) which in some dialects is *kugona* (to sleep/lie). This word is used when one hits an empty pocket. It is also used in life conversations to imply giving up and stopping whatever you were doing. For example, it common to hear an expression "the game is over" (game *yagona*) among urban youth to imply giving up on particular pursuit.

3.2 Rules and strategies

Notation

For easy reference to the pockets in the bawo board (figure 1), let the bawo game be a matrix with four rows, $i = 1, \dots, 4$ and eight columns, $j = 1, \dots, 8$. One player's pockets are represented by a half submatrix of 2 rows and 8 columns (say from pockets or elements {1,1} to {1,8} and {2,1} to {2,8}) and the other a half submatrix of 2 rows and 8 columns (say from pockets {3,1} to {3,8} and {4,1} to {4,8}). There are two versions usually played: simple version and complex version.

Baby level

In what I call the "baby" level[3] or simple version, all the 64 seeds are planted in twos in the 32 pockets (see figure 1 panel A and B). The players agree who is to start the game. If none wants to start, you agree to take out the seeds and start planting again, whoever finishes first will start the game. In the baby version it is easy to know strategies that give you the advantage to win the game after only few rounds.

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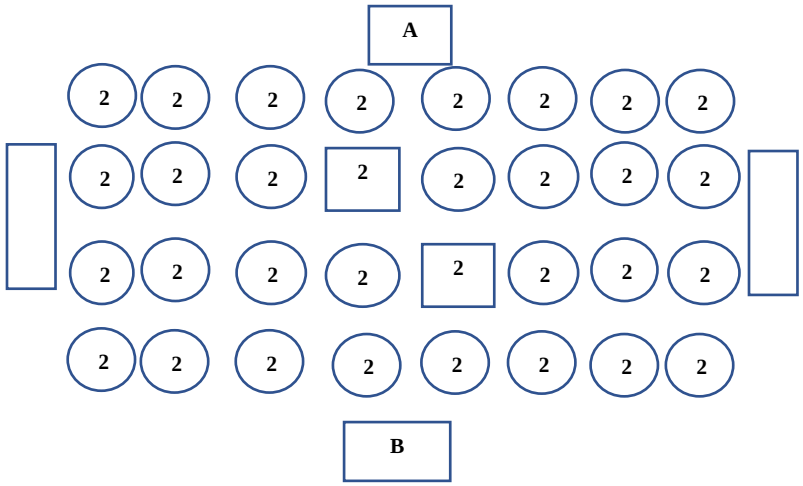

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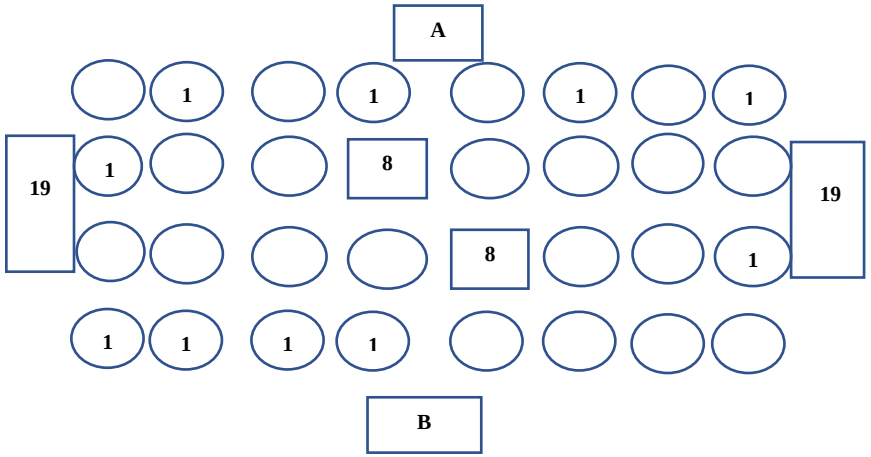

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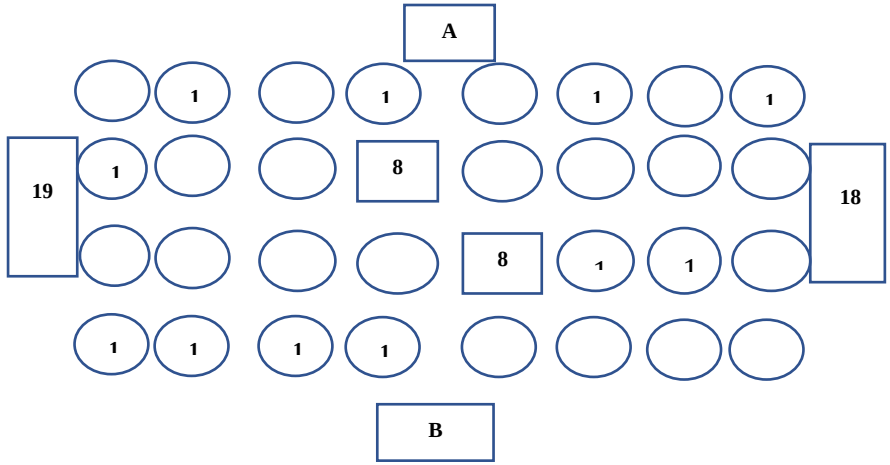

Figure 1: Baby and higher level bawo sowing

Rules of the game

The five key rules for the baby-level game are (be warned that if you have never played the game before, the following rules may be confusing):

I. You eat/capture whenever there is a chance to. You eat when your move lands in a pocket where you have at least one seed in the first row and your opponent has also at least one seed in the corresponding pocket.

II. A player makes a move if and only if the hole has at least two seeds. It is not allowed to move a single seed when starting a move. But one can use single seeded pocket when connecting a play.

III. If you are moving to the left and eat, you pick the seeds you have eaten and start from the first pocket from the side you came from. This applies only to the 6 pockets on the side you are coming from. If instead, you are on the 7^{th} pocket (that is either {2,2} or {3,2} or {2,7} or {3,7}), you pick the seeds to the 8^{th} pocket (that is either {2,1} or {3,1} or {2,8} or {3,8}) then start moving back inside the game.

IV. If you fail to eat but your move is still connecting, you continue moving in the same direction until you get an empty spot then you stop. The opponent is then supposed to make a play.

V. The game ends when the first row of the opponent is all eaten up. The game can also end if the opponent's seeds are all ones in the pockets. In that case, the opponent cannot make a move.

Risk related heuristics and process rationality

Some of the strategies to winning a game which may relate to people's risk aversion as well as ability for complex mathematical skills and reasoning include:

Strategy 1*:* Make sure you spread your seeds throughout the first row. That way, it's difficult for your opponent to eat them all in one move.

Strategy 2: In other circumstances you can spread them on one side if your opponent has no chance to eat as much on that side. At all times, you must make your strategies while considering all the strategies your opponent can make to eat your seeds. It is in your ability to see all the important strategies your opponent can make that makes you win the game.

Strategy 3: If you are playing against the same opponent, it is best to vary your strategies otherwise, you will be figured out.

***Strategy 4*:** Keep houses (piles of seeds) for key strategic moves outside but not too much because losing the game with piles outside is also considered a stupid loss. Avoid accumulating houses in the first row because once eaten, there is a higher chance you will lose the game.

***Strategy 5*:** Even if you win your games, if you spend too much time doing calculations; no one will want to play with you because you are considered a weak opponent. You therefore need to make the calculations very first. Best players make calculations while the opponent is making their move then quickly pick a strategy.

Higher level

Rules

The five key rules for the higher-level game are (be warned that if you have never played the game before or played only the baby level, these rules may be confusing);

I. *Setup:* The seeds are divided equally, that is, each player has 32 seeds.
II. Each player sows eight seeds in the house spot (the 4th pocket from the right side of each player i.e., {2,4} and {3,5}). Each player has five additional seeds to sow (see figure 1 panel C and D). The player who plants first makes the first move.
III. *Movement:* A move is picking one seed from outside (the remaining 19 seeds), add it to a spot where there is at least one seed and move the seeds right or left (see figure 1 panel D and figure 2 for an illustration of a move by each player One can use the house to make the move by picking only one seed from it and then move right or left.). In the figure 1 panel D, player B has started the game by putting a seed in pocket {3,8} then moving left dropping one in {3,7} and the other in {3,6}. In figure 2 panel A, player A moves to the outside row by putting a seed in pocket {2,1} then taking the two seeds, dropping one in {1:1} connecting with the other in {1:2}. Pick the two seeds and drop one in {1:3} and so on.
IV. When eating, you can decide whether to start from the right or left except when eating on the outer two pockets on each side. After getting to the side you want, you then move back in the direction from where you ate from (see figure 2). From figure 2 panel A to

figure 2 panel, player B eats by putting a seed into the {3,7} pocket then taking opponent's seed in {2:7} to {3:8}. In figure 2 panel C, Player A eats by putting a seed into {2:8} cell then taking seed from {3,8}; the three seeds are dropped in {2:7}, {2,6} and {2,5}. In figure 2 panel D, player B was in danger of losing the house so has put one seed in{3,5}, eat from {2,5} and drop the seed in {3,8}. Note that player B had 6 possible strategies.

V. Steps III and IV go on until all seeds are used up in the game. Then the rules and tricks already presented in the baby move are used throughout the game.

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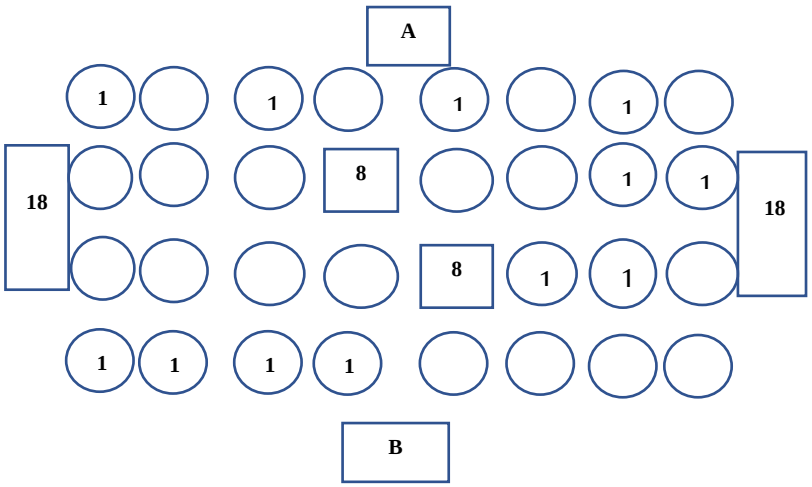

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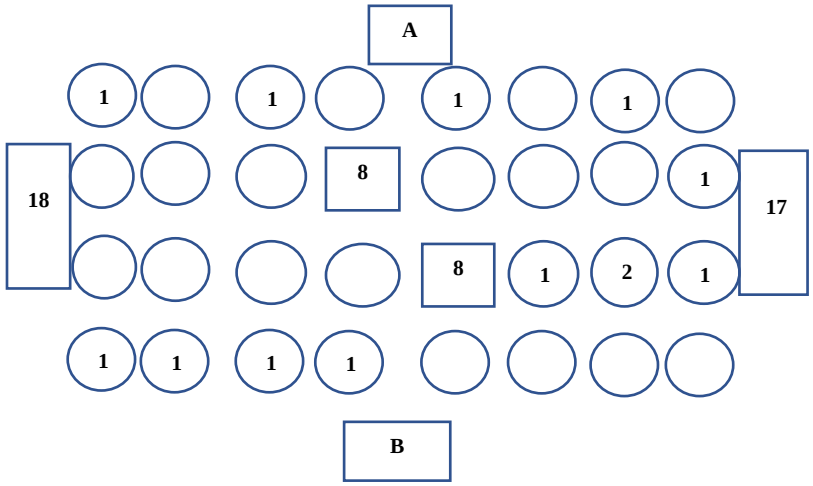

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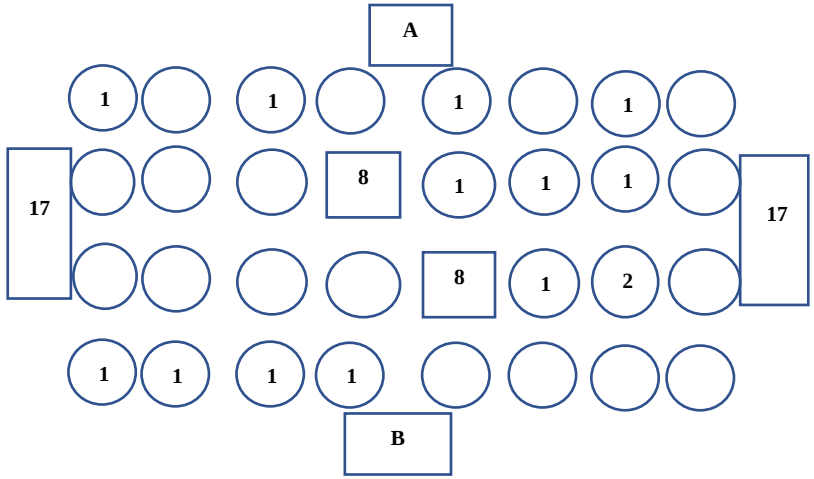

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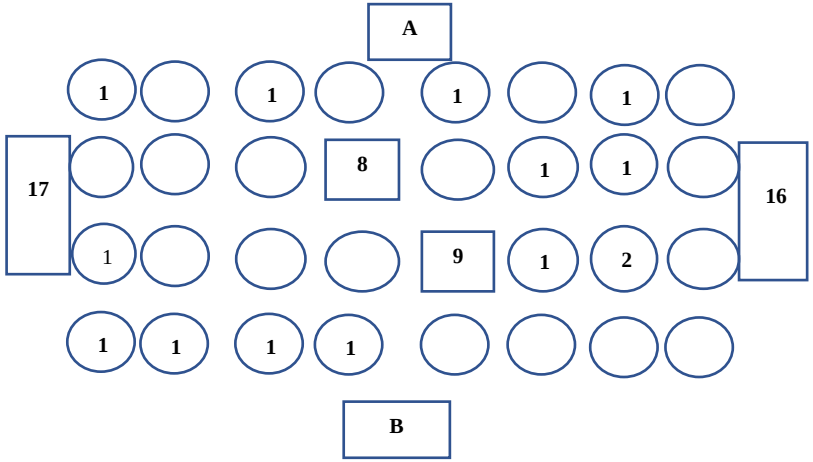

Figure 2: Moves by player A and player B

Some of the winning strategies in the early phase include:

***Strategy 1*:** Play to accumulate enough on your house and strategize so you can move it away and spread the game.

***Strategy 2*:** Keep the game on your right side but make strategies to carefully put seeds on the left so you eat your opponent's house.

Risk related heuristics and process rationality

Beyond using the board as a visual tool for risk elicitation, the fundamental feature of the game is a distinct use of risk attitudes related vocabulary and strategies that are closely related to farm related decisions. For instance, understanding whether risk averse sowing in the game predicts risk aversion in a farmer can help explain why some farmers do not adopt new agricultural technologies until they have learnt enough about its performance. Townshend (1982) also related different strategies in the game to financial decision making as part of the Swahili business ethic in parts of Kenya and Tanzania. Some propositions of how people of different risk attitudes can play the game and make certain farm decisions include:

Proposition 1: Risk averse players keep piles outside to avoid being attacked.

Proposition 2: Patient players use small piles while keeping the big piles for strategic moves.

Proposition 3: A risk loving person will sow seeds on the left side of his/her house. This is because there is high chance of losing the seed because the opponent has the house from which draw seeds from on that side.

Proposition 4: A risk loving person will more likely bet to play to gain even if the game seems over for him/her.

4. Potential Applications of Games of Strategy in Economics

4.1 Risk elicitation experiment using a board game

In this section, I provide an ideal lab-in-the field experiment for risk preference elicitation using bawo. Bawo has the advantage of being well known among rural people, highly complex thereby mirroring everyday decisions and easy for visual display of risk elicitation series. In addition, the vocabulary used by players in the game to refer to various decisions is semantically the same and has the same natural meaning to the vocabulary used in every day decision making. Bawo can be used in a standard risk elicitation exercise in two ways: as a tool familiar to farmers for making calculations and as a way of ranking risk preferences. I describe these using two examples.

Example 1: Prospect theory experiment

Most MPL experiments are presented in 8 x 4 tables. It is difficult for rural people or anyone who has never seen this before to see all lotteries in these tables. They can however easily distinguish the amounts in each pocket depending on the number of marked seeds if a bawo board is used instead (see table 2 and figure 6). Each seed can be specifically designed to have a local currency value say 500 Malawi Kwacha (MK). Then the farmer can easily see based on how big the pile of seeds is; they are used to doing this when playing the game anyways. To demonstrate the importance of the bawo, I provide an example that researchers can adapt to their environment in eliciting risk attitudes. This example uses the bawo board as a platform for presenting the lotteries in a way that even those without numerical skills can make quantitative assessments and reveal their risk preferences.

Consider the following series adapted from Holden (2014) in which probabilities stay constant across tasks but vary across prospects. Prospect A is kept constant within a series, but good outcome is increasing with task number in Prospect B. The instructions for the experiment can be presented as a modification of the standard risk preference elicitation exercise as follows:

Box 1: Modified risk elicitation instructions

"*You are given a chance to play bawo against John or James. If John beats you 6 out of 10 games that you play against him, while James beats you 9 out of 10 games that you play against him; who would you choose to play against if given the following options:*

Task 1: *If you play John-who beats you 6 out of 10- you get MK1000 when you lose but MK4000 when you win. However, if you play James- remember he beats you 9 out 10, if you lose you get MK 500 but if you win you get MK 5000. Who would you want to play against?*

Task 2: *Same amounts for John, but what if you can get MK10000 if you win against James. Would you play James now?*

Task 3: *Same amounts for John, but what if you can get MK15000 if you win against James. Would you play James now?*

…

Task 8: *Same amounts for John, but what if you can get MK40000 if you win against James. Would you play James now?*

The fun part of these lotteries can be to play a game against the farmers for one of the experiments. In addition, take note that instead of playing some abstract individual (say player A) as is done in most risk experiments, the idea is to provide context by providing names. The names can also be randomized.

Table 2: Prospect theory series using table

	Prospect A: Play John					**Prospect B: Play James**				
Task	Probability of bad outcome (%)	Bad	Good	Expected gain	Choice	Probability of bad outcome (%)	Bad	Good	Expected gain	Choice
1	60	1000	4000	2200		90	500	5000	1150	
2	60	1000	4000	2200		90	500	10000	1450	
3	60	1000	4000	2200		90	500	15000	1950	
4	60	1000	4000	2200		90	500	20000	2450	
5	60	1000	4000	2200		90	500	25000	2950	
6	60	1000	4000	2200		90	500	30000	3450	
7	60	1000	4000	2200		90	500	35000	3950	
8	60	1000	4000	2200		90	500	40000	4450	

Source: Adapted from Holden (2014)

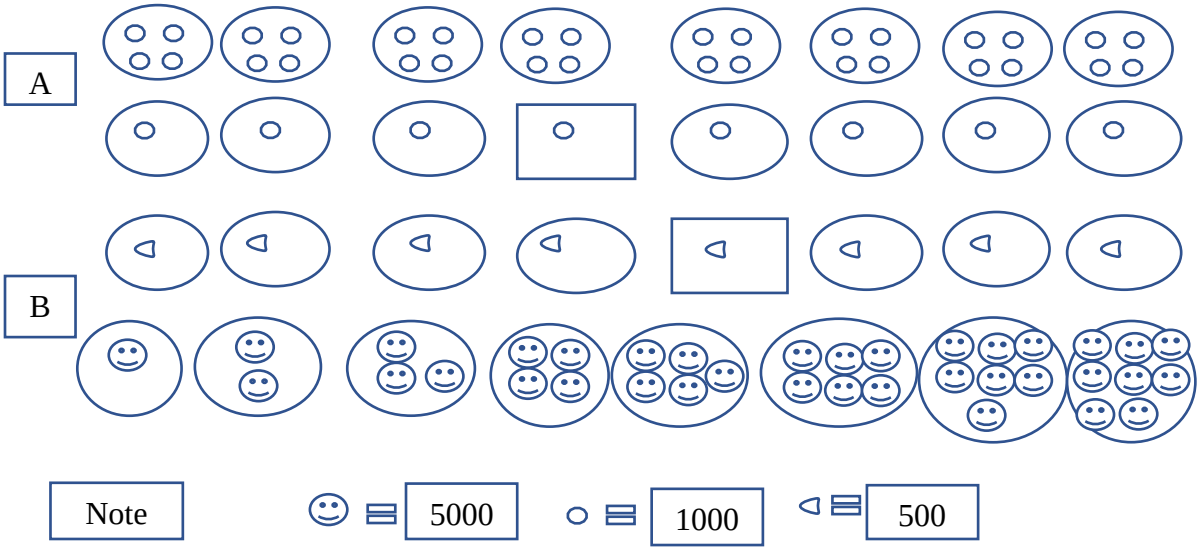

Figure 3: Prospect theory series using bawo board

Once the participants have understood the fixed probabilities, they can easily make their choices for each of the tasks on the mancala board. The idea of moving away from the standard risk preference elicitation as in table 2 (note that the chances are framed in terms of winning the game) to other instruments as shown in figure 3 have been suggested in other studies. Some recent examples include; Gine et al (2016) who used bowls with certain number of tokens in Malawi and Doerr et al (2013) who used colored beads on pairs of sticks in Ethiopia. Holt and Laury (2013), however, cautions the practice of using colored beads as color may blur the effects of payoff differences. It is important to mention a key limitation of H&L that also persists in the setup of the experiment in figure 3, that is, participants will hear the probability you are telling them but actually use their own probability of winning based on their confidence or other factors. For example, if a farmer beats everyone at bawo in the village, he/she will hear the 90 percent chance of losing against player B (James) but use 100 percent chance of winning when making the decision. Overall, the use of familiar games like bawo remains a potential avenue for better future risk elicitation experiments.

Example 2: Start or end of game risk aversion experiment

An alternative approach to MPL is the use of games like television games shows (e.g. Post 2008) and chess to elicit the level of risk aversion. The opening moves of chess have been used in several studies (Gerdes and Gransmark 2010; Dreber Gerdes and Gransmark 2013, Dreber et al 2013) to understand relationships between risk taking and other variables including attractiveness, facial masculinity and gender. The advantage of using chess for risk elicitation is that one can control for ability using the objective measurement of a players' expertise called Elo rating. To measure risk taking, the studies classify standardized chess openings into risky (aggressive) and safe (solid) (Gerdes and Gransmark 2010). In a similar way, it is easy to classify bawo sowing (game opening) into various levels of riskiness. For instance, sowing seeds on the left side of the board is risky because it is easier for the opponent to take them. Just as chess, bawo opening is mostly theoretical or conventional, most players choose the same opening regardless of the opponent. In the end of game experiment, the player can be shown a game that is clearly over for him/her and be asked to either accept defeat and get a certain amount of money or continue playing for a higher amount. The exercise can be presented with increasing amounts of money if they accept to continue playing. One can then determine the switch point of

each of the players. For instance, in the game in figure 4, the player on the top has a lower chance of winning the game.

This use of bawo is similar to the way chess has been used to elicit risk attitudes towards accepting a truce. For instance, Dreber, Gerdes and Gransmark (2013) argues that two risk averse players are more likely to agree to a draw than risk loving players in a game where a draw gives half point with certainty, a loss gives a zero and a win gives one point.

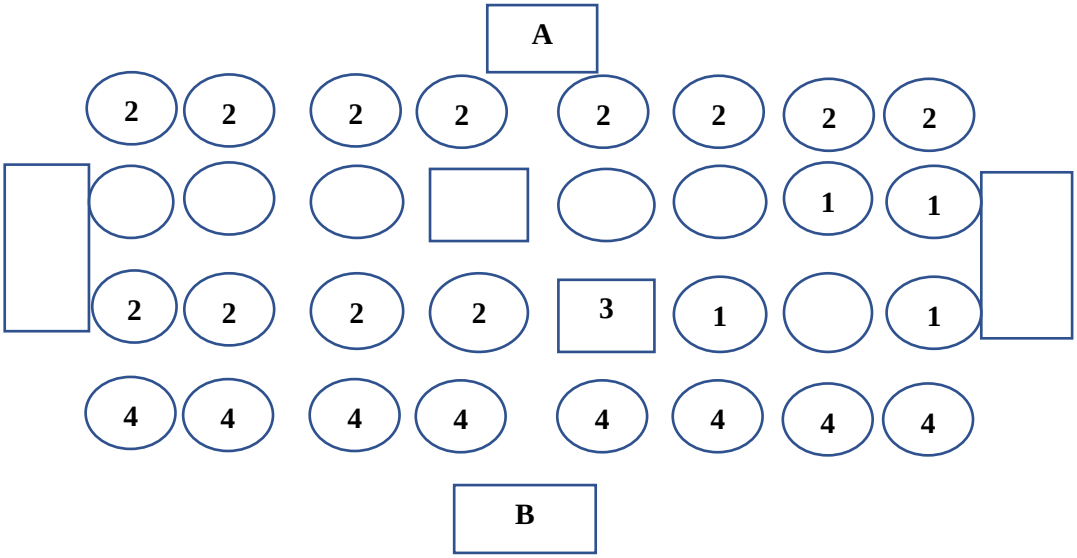

Figure 4: End of bawo game scenario

4.2 Improving mathematics skills among children

Why indigenous board games for improving math skills? A review of evidence in learning outcomes in developing countries for studies conducted in the period 1990-2010 by Glewwe *et al* (2014) found that various conventional school inputs like textbooks, flip charts or teacher training do not increase learning outcomes as is conventionally assumed. In Kenya for example, providing textbooks did not improve test scores (Glewwe, Kremer, and Moulin 2009). Many studies that introduce laptops and other software have had no effects in developing countries as well. It is thus surprising that none of the studies have tested the use of indigenous board games or any other activities that kids do outside the classroom in these rural settings. For adults, initiatives that teach something that goes beyond the classroom like use of cellphones in an adult

literacy class have been reported to improve test scores in Niger (Aker, Ksoll, and Lybbert 2012) and the same could be the case of indigenous board games for rural kids. This proposal should not be misconstrued as a form of indigenization of the school curriculum; technologies that have potential for improving math skills should continue to be tested but if local board games which can even be made to operate on a tablet can be more effective for some kids, then it is logical to test them as well.

This is a clear example of Malawi Kwachas being left on the side-bushes or buried under the pillow. There is an opportunity for serious curriculum development that can have long term learning outcomes if familiar games are introduced. In India, Dillon et al (2017) introduced games based on decades of research in cognitive science (this may have been based on U.S centric research as evidenced by the pictures used in the games). They find that 4 months of math game play yielded marked and enduring improvement on the exercised intuitive abilities, relative to no treatment and active control conditions and immediate gains on symbolic mathematical skills but no effect on subsequent learning of language and concepts in school mathematics. While this research claimed the material cost of $ 217 per pupil for the games was cheap, I argue that some local games in India would have achieved similar or better results at a much lower cost.

In the case of Malawi and many African countries, bawo boards are very cheap. In addition, kids can simply dig on the ground and use stones to play the game. The trick is to put water to soften the ground you want the pockets then use a stick to take out the soil. Most adults know how to play the game at a higher level, this implies that kids can get enough practice at home with their parents, friends and siblings, connect math calculations and strategic reasoning to the strategies of the game. The game also involves complex spatially explicit decisions making it possible to improve children's spatial ability- an important precursor for gaining math skills. The failures in pre-school and primary school interventions to improve math learning of kids over the long term (see for example Ozler *et al* (2018) in the case of pre-schools in Malawi) are because of the lack of practice at home especially during the holidays. If a game like bawo can be linked to the abstract math in early grades, children's math can greatly improve. This proposal is not meant to imply that other games from elsewhere are unimportant. The

experiments by Dillon et al (2017) in India suggest that even U.S. centric games can also have impact on children's cognitive skills in a different context.

The main point is that if math scores are low in lower primary schools in some poor country, it is suboptimal to design an intervention using "what works in" the developed world or other similar contexts like text books, computers and tablets to improve math scores of kids in poor households in a poor country. I argue that a more reasonable experiment would be to relate math skills learned in schools with games that kids play outside the classroom. This argument is related to findings of a recent study by Banerjee et al (2017) that find that children working in informal markets in India can do mathematical calculations of financial transactions even though they fail the formal mathematics tests. This implies that there is potential to linking formal mathematics to such daily market transactions. The potential for mancala board games in mathematics education is not just some utopian proposal. The literature has documented several mathematical concepts that have been taught using board games. These include: combinatorial game theory (especially zero-sum strategic games of perfect information), spatial thinking and discrete mathematics (Bayeck 2017; Voogt, Rougetet and Epstein 2018).

4.3 Other applications

I suggest four other applications of bawo and other related mancala games. First, mancala games can be used to analyze the relationship between laziness, social behavior at workplace and productivity. It is common in Malawi and other African countries to hear the lament that in workplaces where people are unproductive, most of them are pre-occupied with playing bawo or some other board game.

Second, one can study mancala game-based social networks and their importance in adoption of agricultural technologies. Social networks have been proposed to be a mechanism for agricultural technology adoption but much of the field experiments focus on personal contact instead of social contact. There is already compelling evidence in the public health literature that bawo venues are important sources of information about HIV/AIDS especially for young men in Malawi (Paz Soldan 2004 and Kaler 2004). It is still an empirical question whether ideas about farming are also exchanged in these places.

Thirdly, analysis of gender roles and women empowerment can be investigated using the game. Mancala games are usually played by men, but in most communities, women also play the games. One may investigate whether in environments where women play a mancala game therefore usually or occasionally beat men at the game, women are more empowered. This type of research can be along the lines of recent studies in economic history that investigate the evolution of gender roles e.g., a study by Alesina, Giuliano and Nunn (2013) that finds evidence of differentiated gender roles due to historical practice of plough agriculture.

Fourth, mancala can be used to analyze the relationship between institutions, culture and trust. Because, there is a multiplicity of positions in the game such that it is difficult for an opponent to remember the number of seeds in each pocket; it is easier for someone to cheat by either dropping more seeds than required or even transferring some seeds when an opponent is not looking at the board. Townshend (1979) lamented in an exaggerated way that unlike chess, a wide variety of cheating techniques are used in mancala with the only stigma being that of detection. It is imaginable to use bawo or another local board game as a more realistic experimental game as compared to rolling of a dice as used for example by Lowes et al (2017) in an experimental resource game to measure whether participants follow pre-specified rules and therefore their propensity to cheat. For bawo, a player can also guess quite well the amount of seeds one is hiding in the hand and whether one has cheated by just looking at the face of the opponent. These social skills are also important in everyday relationships.

Finally, a research venture that would be worth pursuing given debates of how to increase entrepreneurship in African countries is to analyze whether bawo or other indigenous board games are origins of entrepreneurship in Africa. Anecdotally, it is well known in Malawi that the tribe (Yao) that plays the most complicated version of the game is historically also mostly engaged in non-farm businesses. According to Mwale (1996), bawo was intended originally to be a means of keeping business transactions-it is an image of the act of buying and selling.

5. Conclusion

This paper is a first attempt to convince and invite economics students, researchers, and other social scientists to use indigenous games of strategy in understanding the economic behaviors of rural poor people. Most importantly, indigenous games can play a function of building rapport

between the researcher and the participants. The entertainment that participants can get from the game can be much more than a boring interview based on paper questionnaires or a forced game of choosing lotteries. Economists should be the first to understand a golden rule in field research- never do unto others especially rural poor people what you do not wish for yourself. Indeed, many adults who were not successful in the classroom find it intimidating to be subjected to exam-like questions as used in risk elicitation exercises. The use of board games can help kill two birds with one stone: make the interviews less intimidating and collect accurate data.

There are nonetheless two important limitations to using mancala board games for risk elicitation, math learning and the economic applications suggested. Firstly, these games are usually played by males. Though most females know how to play the games, being male dominated game may limit the usefulness. There are, however, other indigenous games that are female dominated that can be considered when designing risk elicitation studies. Secondly, a mancala game has many rules and possibilities such that strategies easily compound in such a way that it is inconceivable to calculate subjective probabilities of winning or losing the game.

Notwithstanding these limitations, the main purpose that undergird the research agenda being proposed remains. In a review of lab-in-the field experiments on elicitation of risk attitudes in developing countries, Hurley (2010, p.28) argued that these experiments do not answer the question on *"the extent to which the risk attitudes identified in these controlled experiments are consistent with the risk attitudes exhibited when making important decisions regarding more common activities such as how much time to devote to farming, which crops to plant, and how much fertilizer to use*." Economics of game of strategy in culture is being proposed along those lines, that is, the direct linking of experimental findings to actual decisions people make. A poem called *"a game of bawo"* by Felix Mnthali, a Malawian poet, helps put this research agenda in perspective:

Take your cue from a game of Bawo
where sides at the edge of doom
are best conceded as losses
and easy withdrawal
leads to stunning victories

Springs hot and cold, dry up;
flowers bloom and fade
and trees at times shed their leaves and their barks
neither recall the bloom

nor visit springs that once gushed waters -
memories are sweetest unruffled by daylight and
forced ceremonies stink worst than rudeness

This meticulous insouciance
these decoys made in heaven
follow a standard design
with familiar specifications

Take your cue from a game of Bawo;
neither recall the bloom of flowers
nor the showers of spring.

References

Aker, Jenny C, Christopher Ksoll, and Travis J Lybbert. 2012. "Can Mobile Phones Improve Learning? Evidence from a Field Experiment in Niger." *American Economic Journal: Applied Economics* 4 (4): 94–120.

Alekseev, Aleksandr, Charness, Gary, Gneezy, Uri. 2017. "Experimental methods: When and why contextual instructions are important." *Journal of Economic Behaviour and Organization* 134:48-59.

Alesina, Alberto, Giuliano, Paola, and Nunn, Nathan. 2013. "On the Origins of Gender Roles: Women and the Plough." *Quarterly Journal of Economics* 128 (2): 469-530.

Banerjee, Abhijit, La Ferrera, Eliana, Orozco, Victor. 2018. The Entertaining Way to Behavioural Change: Fighting HIV with MTV. Working Paper.

Banerjee, Abhijit, Bhattacharjee, Swati, Chattopadhyay, Raghabendra, and Ganimian, Alejandro, J. 2017. "The Untapped Math Skills of Working Children in India: Evidence, Possible Explanations, and Implications". Working Paper.

Bayeck, Rebecca, Yvonne. 2017. " A review of five African board games: is there any educational potential?" Cambridge Journal of Education. DOI: 10.1080/0305764X.2017.1371671

Binswanger, Hans, P. 1980. "Attitudes toward Risk: Experimental Measurment in Rural India." *American Journal of Agricultural Economics* 62(3): 395-407. doi.org/10.2307/1240194.

Binswanger, Hans, P. 1981. Attitudes toward Risk: Theoretical Implications of an Experiment in

Rural India. *The Economic Journal* 91(364): 867-890.

Brick, Kerri, Martine Visser, and Justine Burns. 2012. "Risk Aversion: Experimental Evidence from South African Fishing Communities." *American Journal of Agricultural Economics* 94 (1): 133–52. doi:10.1093/ajae/aar120.

Cassar, Alessandra, Healy, Andrew, Kessler, Carl. 2017. "Trust, risk, and time preferences after a natural disaster: Experimental evidence from Thailand*." World Development* 94: 90-105.

Charness, Gary, and Viceisza, Angelino. 2016. Three Risk-Elicitation Methods in the Field: Evidence from Rural Senegal. *Review of Behavioural Economics* 3(2):145-171.

Chen, Keith, M. 2013. The Effect of Language on Economic Behaviour: Evidence from Savings Rates, Health Behaviors and Retirement Assets. *American Economic Review* 103 (1032): 690-731. doi: 10.1257/aer.103.2.690.

De Voogt, Alexander J. 2002. "Reproducing Board Game Positions: Western Chess and African Bao." *Swiss Journal of Psychology* 61 (4): 221–33. doi:10.1024//1421-0185.61.4.221.

Delavande, Adeline, and Hans-Peter Kohler. 2007. "Subjective Expectations in the Context of HIV/ AIDS in Malawi." *Demography Research* 20: 817–74. http://repository.upenn.edu/parc_working_papers%0Ahttp://repository.upenn.edu/parc_working_papers/4.

Delavande, Adeline, and Hans Peter Kohler. 2016. "HIV/AIDS-Related Expectations and Risky Sexual Behaviour in Malawi." *Review of Economic Studies* 83 (1): 118–64. doi:10.1093/restud/rdv028.

Delavande, Adeline, Gine, Xavier, and McKenzie, David. 2011. Measuring subjective expectations in developing countries: A critical review and new evidence. *Journal of Development Economics* 94 (2): 151-163. doi: 10.1016/j.jdeveco.2010.01.008.

Dillon, Moira R, Harini Kannan, Joshua T Dean, Elizabeth S Spelke, and Esther Duflo. 2017. "Cognitive Science in the Field: A Preschool Intervention Durably Enhances Intuitive but Not Formal Mathematics." *Science* 55 (July): 47–55. doi:10.1126/science.aal4724.

Dreber, A., Christer Gerdes, P. Gränsmark, and A. C. Little. 2013. "Facial Masculinity Predicts

Risk and Time Preferences in Expert Chess Players." *Applied Economics Letters* 20 (16): 1477–80. doi:10.1080/13504851.2013.826861.

Dreber, Anna, Christer Gerdes, and Patrik Gränsmark. 2013. "Beauty Queens and Battling Knights: Risk Taking and Attractiveness in Chess." *Journal of Economic Behavior and Organization* 90. Elsevier B.V.: 1–18. doi:10.1016/j.jebo.2013.03.006.

Drichoutis, Andreas, C., and Lusk, Jayson, L. 2016. What can multiple price lists really tell us about risk preferences. *Journal of Risk and Uncertainty* 53: 89-106. doi: 10.1007/s11166-016-9248-5.

Franzel, Steven. 2000. "Use of an Indigeneous Board Game, 'Bao', for Assessing Farmers' Preferences among Alternative Agricultural Technologies." In *Proceedings of the 2000 International Agricultural Economics Assocation Conference*.

Gerdes, Christer, and Patrik Gränsmark. 2010. "Strategic Behavior across Gender: A Comparison of Female and Male Expert Chess Players." *Labour Economics* 17 (5): 766–75. doi:10.1016/j.labeco.2010.04.013.

Gine, Xavier, Goldberg, Jessica, Silverman, Dan, and Yang, Dean. 2018. Revising Commitments: Field Evidence on the Adjustment of Prior Choices. *The Economic Journal* 128 (608): 159-188.

Glewwe, Paul, Hanushek, Eric, A., Humpage, Sarah, and Ravina, Renato. 2014. School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2010. Edited by Glewwe. In:Education Policy in Developing Countries. University of Chicago Press. Chicago.

Glewwe, Paul, Michael Kremer, and Sylvie Moulin. 2009. "Many Children Left Behind ? Textbooks and Test Scores in Kenya Behind ? Many Children Left." *American Economic Journal: Applied Economics* 1 (1): 112–35.

Gobet, Fernand, Alex de Voogt, and Jean Retschitzki. 2004. *Moves in Mind: The Psychology of Board Games*. Vol. 53. doi:10.1017/CBO9781107415324.004.

Holden, Stein T. 2014. "Risky Choices of Poor People: Comparing Risk Preference Elicitation Approaches in Field Experiments Risky Choices of Poor People: Comparing Risk

Preference Elicitation Approaches in Field Experiment." https://www.nmbu.no/sites/default/files/pdfattachments/clts_wp_10_14.pdf.

Holt, Charles, A. and Laury, Susan, K. 2002. Risk Aversion and Incentives Effects. *American Economic Review* 92(5): 1644-1655.

Holt, Charles, A. and Laury, Susan, K. Assessment and Estimation of Risk Preferences. *Handbook of the Economics of Risk and Uncertainty* 1: 135-201.

Hurley, Terrance, M. 2010. A Review of Agricultural Production Risk in the Developing World. Harvest Choice Working Paper.

Jacobson, Sarah, and Petrie, Ragan. 2009. "Learning from Mistakes: What Do Inconsistent Choices over Risk Tell Us?" *Journal of Risk and Uncertainty* 38 (2): 143–158. doi:10.1007/s11166-009-9063-3.

Jakiela, Pamela, and Owen Ozier. 2017. "Gendered Language." Working paper.

Kayange, Grivas. 2014. Understanding the Semantics of Chichewa Proverbs in the Light of Contemporary Philosophy of Language. *Journal of African Cultural Studies* 26 (2): 220-233. doi: 10.1080/13696815.2014.887461.

Kaler, Amy. 2004. AIDS-talk in everyday life: the presence of HIV/AIDS in men's informal conversation in Southern Malawi. *Social Science & Medicine* 59: 285-297. doi: https://doi.org/10.1016/j.socscimed.2003.10.023.

Kyule, Mwanzia. 2016. "The Bao: A Board Game in Africa's Antiquity." *Conservation of Natural and Cultural Heritage in Kenya: A Cross-Disciplinary Approach*, 93–107.

La Ferrara, Eliana, Chong, Alberto, and Duryea, Suzanne. 2012. Soap Operas and Fertility: Evidence from Brazil. *Americal Economic Journal: Applied Economics* 4(4): 1-31.

Lowes, Sara, Nunn, Nathan, Robinson, James, A., and Weigel, Jonathan, L. 2017. The evolution of culture and institutions: Evidence from the Kuba Kingdom. *Econometrica*, 85 (4): 1065-1091.doi:https://doi.org/10.3982/ECTA14139.

Le Cotty, Tristan, Elodie Maître d'Hôtel, Raphael Soubeyran, and Julie Subervie. 2017. "Linking Risk Aversion, Time Preference and Fertiliser Use in Burkina Faso." *Journal of*

Development Studies 00 (00). Routledge: 1–16. doi:10.1080/00220388.2017.1344645.

Meinzen-Dick, Ruth, Janssen, Marco, A., Kandikuppa, Sandeep, Chaturvedi, Rahul, Rao, Kaushalendra, Theis, Sophie. 2018. "Playing games to save water: collective action games for groundwater management in Andra Pradesh, India." *World Development* 107:40-53.

Murray, H.J.R. 1952. *"A history of board games other than chess."* Oxford: Clarendon Press.

Mwale, Stanley, K. 1996. BAO. *The Society of Malawi Journal*, 49 (1): 56-70.

Özler, Berk, Lia C H Fernald, Patricia Kariger, Christin McConnell, Michelle Neuman, and Eduardo Fraga. 2018. "Combining Preschool Teacher Training with Parenting Education - A Cluster-Randomized Controlled Trial." *Journal of Development Economics* 133: 448–67. doi:10.1016/J.JDEVECO.2018.04.004.

Paz Soldan, Valerie. 2004. "How family planning ideas are spread within social groups in rural Malawi". *Studies in Family Planning*, 35 (4): 275-290. Doi: 10.1111/j.0039-3665.2004.00031.x.

Post, Thierry, Martijn Van Den Assem, Guido Baltussen, and Richard H Thaler. 2008. "Deal or No Deal? Decision Making under Risk in a Large-Stake TV Game Show and Related Experiments." *American Economic Review* 98 (1): 38–71. doi:http://dx.doi.org/10.1257/aer.98.1.38.

Riley, Emma. 2018. Role models in movies: the impact of Queen of Katwe on student's educational attainment. Working Paper.

Roothaert, R. L., and S. Franzel. 2001. "Farmers' Preferences and Use of Local Fodder Trees and Shrubs in Kenya." *Agroforestry Systems* 52 (3): 239–52. doi:10.1023/A:1011896921398.

Sanderson, Meredith, G. 1913. Native Games of Central Africa. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 43: 726-736.

Simon, Herbert A. 1955. "A Behavioral Model of Rational Choice." *Quarterly Journal of Economics* 69 (1): 99–118.

Tanaka, Tomoni, Camerer, Colin, F., and Nguyen, Quang. 2010. Risk and Time Preferences:

Linking Experimental and Household Survey Data from Vietnam. *American Economic Review* 100(1): 557-571. doi: 10.1257/aer.100.1.557.

Tanaka, Yuki, and Alistair Munro. 2014. "Regional Variation in Risk and Time Preferences: Evidence from a Large-Scale Field Experiment in Rural Uganda." *Journal of African Economies* 23 (1): 151–87. doi:10.1093/jae/ejt020.

Townshend, Philip. 1979. African Mankala in Anthropological Perspective. *Current Anthropology* 20 (4): 794-796. doi:10.1086/202380.

Townshend, Philip. 1982. Bao (Mankala): The Swahili Ethic in African Idiom. Paidema, Bd. 28, From Zinj to Zanzibar: Studies in History, Trade and Society on the Eastern Coast of Africa. Pp. 175-191.

Voogt, Alex, Rougetet, Lisa, and Epstein, Nathan.2018. "Using mancala in the mathematics classroom." *The Mathematics Teacher* 112 (1): 14-21.

Notes

[1] There are many variants of the rules. I provide rules from my personal experience of playing the game. Other sources of rules of the game as played in Malawi include, Mwale (2016) and the following sites; http://gamecabinet.com/rules/Bao2.html and http://www.jacks.de/bawo/bawo_english2010.pdf.

[2] The earliest paper I could find in the economics of language was published in 1965 by Jacob Maschak.

[3] Most of the literature in bawo calls this “women” version but this has a wrong sexist connotation that goes against the terminology that rural people who currently play the game use which is that it is a simpler version or the one they start to teach to kids.