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RED LIGHT, GREEN LIGHT: ALTERING ATTITUDES ABOUT CLIMATE CHANGE WITH A "GAME PRACTICE" SIMULATION GAME

A.J. Williams – R. H. Williams
University of Kansas - Maple Woods College

RESUMEN

A pesar de las advertencias de la comunidad científica, los Estados Unidos no han tomado medidas para reducir las emisiones de gases de efecto invernadero. Ni los políticos ni los ciudadanos reconocen el peligro que el cambio del clima supone para el país y el mundo. Hemos creado un juego de simulación, *Red Light, Green Ligh*t, con el fin de intentar cambiar sus actitudes y conductas para que sean conscientes de esta amenaza. Se desarrolló por medio de la teoría de la Identificación Múltiple (MIT), un modelo teórico para diseñar simulaciones que facilitaran el cambio actitudinal y de conducta. Este trabajo proporciona una descripción global del *Red Light, Green Light*. También se describe lo que hemos observado en los juegos-prueba con respecto a las estrategias que los participantes utilizar al jugar. Además, explicamos cómo las simulaciones de MIT representan "el juego práctico" en lugar de "la teoría del juego" y la importancia de diseño del juego práctico para simulaciones que tratan de trasladar el aprendizaje del juego a la vida real.

ABSTRACT

Despite the scientific community's warnings, the United States has not taken action to significantly reduce its greenhouse gas emissions. Politicians as well as citizens consistently fail to recognize the peril that climate change poses to the country and the world. In an effort to change their attitudes and behaviors so that they will be more likely to address this threat, we created the *Red Light, Green Light* simulation game. *Red Light, Green Light* was developed via Multiple Identification Theory (MIT), a theoretical model for designing simulations so that they will be more likely to promote attitudinal and behavioral change. The present paper provides an overview of the *Red Light, Green Light* simulation. We also discuss what we have observed in play-tests regarding the strategies that participants use when playing the game. Additionally, we explain how MIT simulations represent "game practice" rather than "game theory" and the importance of a game practice design for simulations seeking to encourage the transfer of game learning to real life.

Key words: Red Light, Green Light simulation game, attitudes and climate change, MIT

In his famous *I Have a Dream Speech*, Martin Luther King spoke about the *fierce urgency of now*. King referred to combating racial prejudice. But today, *the fierce urgency of now* could also be applied to the need to address climate change[1]. Numerous scientific bodies, including the Intergo-

[1] Although "climate change" is the preferred scientific term, in a bow to popular rhetoric, "climate change" and "global warming" will be used interchangeably throughout this article.

vernmental Panel on Climate Change (2007), the Joint Science Academies (2007), the International Council for Science (2007) and the World Meteorological Organization (2006), endorse the view that greenhouse gas emissions must be significantly reduced. Despite the fact that the United States remains a leading contributor of these emissions, many Americans policymakers cling to a dangerous *wait-and-see* attitude toward climate change (Sterman and Booth Sweeney, 2007). One sees this same hesitant stance among the preponderance of United States citizens who, while viewing climate change as a problem, consider it to be only a moderate risk (Leiserowitz, 2006).

If we accept the voice of science and its warnings**,** and if we recognize the relative apathy with which these warnings have been met, we must also accept the need to mobilize public opinion so that the U.S. may "go green" in a meaningful way. Making this happen requires changing people's attitudes in the hope that different thinking leads to different behaviors.

This change in mindset necessitates more than just a cognitive understanding of the situation. If the polls are to be believed, that already exists. What is needed is for citizens to find a deeper, more personal belief in confronting climate change that will inspire them to change in an environmentally conscious direction. A worthy goal, but how can it be accomplished?

Simulation games and attitude change

The experiential nature of simulation games marks them as a promising educational approach. Proponents of simulation declare that rather than just informing participants of the facts, simulations immerse people in lifelike scenarios, allowing them to encounter and develop understandings that can result in changes in attitudes and, subsequently, behaviors. The claim sounds enticing, but historically, research wavers as to the degree of confidence one can have in the ability of games to modify attitudes. Cherryholmes (1966) and Garvey and Seiler (1968) argued that games could not change attitudes. Other researchers (Guetzkow, Chadwick, Brody, Synder and Noel, 1963; Williams, 1980; Olivas and Newstrom, 1981; Bredemeir, Berstein and Oxman, 1982; Williams, R. H., McCandless, Hobb and Williams, S. A., 1986; Williams and Williams, 1987) reached the opposite conclusion. As a suggestion for resolving the questions, Schumacher (1997) called for a theoretical model to identify the particulars of how games can alter attitudes consistently. We devised Multiple Identification Theory (MIT) as an attempt to meet this standard.

Multiple identification theory

MIT posits that a simulation maximizes its ability to change attitudes when it creates three different types of identification within its players. These forms of identification correspond to what Eagly and Chaiken (1998) recognize as the three aspects of an attitude: affection, cognition, and behavior.

Affective identification refers to cases in which players become emotionally engaged in the outcome of a simulation and are personally invested in winning the game. Such identification makes two important contributions to the learning that comes from a simulation experience. First, Sousa (1995) states that information acquired under conditions of emotional arousal become memorables and is likely to be retained into the future. Affective identification also steps toward remedying the situation in which people who are not emotionally identified with the outcome of a simulation play capriciously. Making unreflective choices, these participants glean little from the experience that holds meaning in real life. In contrast, players who care about winning select their actions with serious intent, learning the most from a game by playing it realistically. Simulations best achieve this outcome when they follow the guideline that people care about those things that impact their welfare. If participants are to care about the results of a game, it, too, must hold consequences for them. Affective identification can be realized if a strong incentive (often times money or, in a class setting, extra credit points) is offered to players for winning the game.

A second form of identification MIT proposes necessary for attitude change is cognitive in nature. *Cognitive identification* means that participants identify the simulation at an intellectual level as being like real life. Without this identification, players may care about a game's outcome (affective identification), they may learn strategies to win the simulation, but they will not apply these insights to behaviors and attitudes in their day-to-day lives. This circumstance occurs if players see a disconnect between the simulation and reality. In such cases, they separate *game truths* from *life truths* and do not extend what works in the former to the latter. We once played a board game that awarded victory to the individual accumulating the most money. Occasionally, players had the option to visit a gambling casino. Anyone who played the game a few times learned that it was *always* the right choice to go to the casino, since the odds of hitting a jackpot were absurdly high. The players, of course, realized that the generosity of casinos only existed in the game. Many jokingly commented upon the difference between the simulation's payoffs and those in Las Vegas. Thankfully, it is unlikely that any of these individuals translated their game experience into a life strategy.

If a game's designer wants to increase the odds of participants' attitudes changing outside of the simulation, then the dilemmas faced, the nature of the interactions and the results that can be obtained in the game must parallel reality. Furthermore, players need to be aware of the fidelity between the simulation and life. To meet this end, the game directors (those in charge of running the simulation) should point out to players (during the game's play and especially in the post-game debriefing) instances in which the game's occurrences are like those of the world. The development of cognitive identification encourages players to link their simulation experiences to life; they perhaps tell themselves, "This game is realistic, so what works here should also work in reality."

The realization of cognitive identification (partnered with affective identification) fosters attitude change at a cognitive or intellectual level. But even this may not be enough to do the job of convincing players to transfer a game's learnings to the ways they actually *live*. Consider that millions of university students desire good grades and *know* that it is prudent to study for examinations well ahead of the date that they sit them. However, countless numbers of these same individuals wait until the night before the exam to prepare! Often times, knowledge and caring are not enough to truly modify attitudes and behavior. Therefore, while affective and cognitive identification are necessary for changing attitudes/behaviors about climate change, they are not sufficient.

The final piece of the puzzle is what we call *behavioral identification*. It is for the sake of moving people to *act* on their intellectual positions that behavioral identification should be created in a simulation seeking to change attitudes. When people learn something through their own freely chosen actions, it promotes change that goes beyond *intellectually knowing* to *knowing for one's self*. This is the depth of change that can alter players' attitudes and behaviors both in the game and outside of it.

Games support behavioral identification by maximizing the opportunities players have to develop and execute their *own* strategies during the simulation. In this way, the results experienced carry with them the convincing power of having been learned by my own behaviors. Creating such conditions means that the game cannot simply provide players with two or three structured actions to choose between. In such instances, people are only making a forced choice among the limited options others have supplied. Decisions made in this manner are not individually chosen behaviors, and at a game's end, players will see themselves as having followed the paths provided for them, not ones they created.

The first step in establishing behavioral identification requires giving participants the freedom to construct unique strategies from a great number of possible alternatives. In this way, participants have ownership of their choices, and the consequences will have meaning for them. Players should also be allowed to play the simulation multiple times so that they can create, tryout and see the outcome of different approaches. This process, coupled with thoughtful post-game debriefings, helps participants learn the impact of actions at the deepest personal level, the level at which learnings are most likely to transfer to life.

In MIT, the three types of identification work in combination. Affective identification encourages players to take the game seriously, increasing the odds that they will learn its lessons; cognitive identification inspires the conviction that the game truly represents reality; and behavioral identification helps players believe that their game learning can be a guide for living life. Figure 1 (from Williams and Williams, in press) highlights the principles of MIT.

Figure 1
Summary of MIT as a Model for Simulation Design to Promote Attitude Change

	Aspects of Identification		
	Affective Identification	*Cognitive Identification*	*Behavioral Identification*
Description of Identification	Players are emotionally involved or "identified" with the outcome of the game.	Players identify the simulation with reality and see its principles as valid in real life. The game has "believability."	Players identify the lessons of the game as learning that has been personally lived, accepted and/or chosen.
Conditions within the simulation experience facilitating each kind of identification	1) Strong incentives for game winners	1) Game structure matches reality 2) Game director makes players aware of match between game structure and reality as the game is being played 3) Post-game Debriefing	1) Freedom t create, experience and execute a wide range of possible strategies & receive feedback 2) Replay game 3) Post-game Debriefing

Indicators of attitude change	Emotional investment in game enhances players' motivation to modify attitudes in accord with what has paid off for them in the game Affective Indicator of Attitude Change	Develop new schemes or beliefs; intellectual change Cognitive Indicator of Attitude Change	Develop personal commitment to new behaviors; transfer of game's lessons to other settings Behavioral Indicator of Attitude Change

We have conducted two previous studies (Williams and Williams, 2007; Williams and Williams, in press) investigating the effectiveness of MIT designed simulations in changing attitudes. In both cases, data indicated the games were effective in moving players' attitudes and behaviors from stances of competition to cooperation in issue relating to international conflict.

MIT simulations are not limited, however, to the study of conflict. We believe that MIT can be used as a tool for crafting games to change a wide variety of attitudes, including those related to climate change. Our most recent simulation, Red Light, Green Light, while still allotting some focus towards competition and cooperation, tackles directly the issue of climate change at national and international levels.

Overview of the red light, green light simulation

Participants in the game play as members of one of six teams: China, the European Union, India, Japan, Russia or the United States. The simulation comprises three turns of short-term interactions (each representing 15-20 years worth of time) and a final *posterity turn* forecasting results 50-100 years after the conclusion of the short-term play.

During each of the short-term turns, teams have 15 chips (representing their effort for the turn) to spend. These chips can be assigned to economic growth or options addressing climate change (cap and trade systems, raising auto fuel efficiency standards and investing in alternative fuels research). Every turn, teams gain and lose victory points based on the well-being of their economies and the impact of warming on the climate. A provision also exists for teams to censure each other, an action deducting victory points from the targeted team. The long-term or posterity results turn follows the short-term stages of the simulation and projects future outcomes. The effects of these results are also factored into teams' victory point totals. A team wins by finishing the game with a positive victory point total. Teams that end the simulation with zero or negative points lose. It is possible for all teams to win, all to lose, or there can be a mixture of results.

Flow and particulars of the game

At the beginning of each short-term turn, teams huddle to plot strategy. During this initial period, they can also send ambassadors to other teams to discuss possible cooperative agreements, threats, etc. At the end of the strategy/negotiation phase, teams secretly fill out strategy forms. On the form, they indicate how they want to divide up their 15 chips. Chips can be invested into economic growth or the green options: cap and trade schemes, better auto efficiency standards and alternative fuels research. If a team wishes, it can spend all 15 chips on its economy, all 15 on the three environmental options or divide the 15 up into some combination of the four possibilities.

Despite the fact that the game is intended to be played in less than 90 minutes, there are a host of strategic options available. As part of creating behavioral identification, the game permits players to tailor their plans with great individuality. This is born out not only in the many possible combinations of chip play, but also in numerous possibilities for negotiation tactics. The amount of time a certain team spends talking (or not talking!) with other teams, the deals proposed and the arguments and tactics used are all at the discretion of the participants.

The game directors collect the strategy forms, reveal the actions teams have taken and determine the results. How well a given team performs economically yields immediate gains or losses of victory points for that team only. In keeping with the competitive realities of global economics, the two top performing teams economically earn additional victory points, while the two worst performing teams lose points. Meanwhile, teams' investment into cap and trade, auto efficiency standards and alternative fuels research is measured globally. The game directors convert the chips played by all teams into a cumulative total of anti-warming *green points*. (Alternative fuels research constitutes a long-term project that plays a role at the end of the game.) The directors also track the progress of global warming, displaying it on a chart visible to all players. At the end of each turn, tables available only to the game directors add a certain number of warming "red points" to the global warming chart. The anti-warming green points are then factored into the chart, decreasing the total amount of warming that occurs. After all of this, the directors announce the effects of the warming (e.g. floods, droughts and a corresponding loss of victory points for everyone) to the players.

At first, the results of climate change tend to be of only moderate intensity (increase in the violence level of storms, some desertification, etc.) This depicts projections for the next 15-20 years. However, in following turns, if global warming increases, the consequences grow more severe (population relocation, wars over territory and resources, etc.) The more warming that occurs, the more points all teams lose. Unless players take determined environmental actions, the impact and accompanying point loss quickly become catastrophic. The game does not suggest that all of the negative effects of climate change can be mitigated. But by the third turn of the game, if teams have been investing heavily in anti-warming efforts all along, the effects of the warming over the 60 years represented in the simulation will be manageable. To really solve for climate change, however, teams must also have had a strong long-term commitment to alternative fuels research.

The effectiveness of alternative fuels research is only determined at the simulation’s conclusion: either a breakthrough in research occurs (representing huge leaps forward in the viability of non-greenhouse gas emitting fuels) or it does not. If the breakthrough happens, it significantly contributes to the eventual stabilization of the planet’s temperature. As one might expect, the more research into alternative fuels that teams conduct throughout the simulation, the greater the likelihood that a breakthrough will be forthcoming.

Challenges to combating climate change

The simulation argues that successful solutions to climate change come by global and cooperative efforts. Yet true to life (cognitive identification), the structure of Red Light, Green Light makes this approach difficult to realize. Many aspects of the game favor competition. In the simulation, as in the world, climate change does not occur in a vacuum, and the desire to resist it can be countered by more imminent concerns. In Red Light, Green Light, a demanding economic reality confronts the players, stimulating an atmosphere of competition by awarding teams with positive or negative victory points based on their economic performance relative to rival teams. Initially, the points gained or lost economically dwarf those arising from the effects of global warming. These economic concerns exert a potent influence, shaping players strategies in a competitive direction.

A second barrier to cooperative efforts flows from the game’s procedures allowing actions to be taken with secrecy, thereby reinforcing the potential for political backstabbing and mistrust. Countries may work out deals, but in the end, the only people who see a given team's turn form before it is handed in are the people on that team. Players looking to get ahead can agree to cooperative action on climate change, then invest heavily in their economy instead, counting on others to carry the green burden while they profit from superior economic growth. No one knows how faithful teams' promises will prove until the forms are already submitted. In our play-test experience with Red Light, Green Light, we found fears of betrayal to be well founded since reneging on arrangements to pursue selfish ends seemed a common occurrence.

The inherent uncertainty or *fog of war* built into the simulation forms a third formidable obstacle to cooperation. Real life holds much information that we cannot know with precision. The design of Red Light, Green Light also creates this condition. Since the climate change results charts are only visible to the game directors, players have a general idea that the warming of the planet is undesirable, but they do not possess specific info as to what the effects of climate change will be. Even if teams decide to trust one another, the lack of exact calculations prevents players from constructing the perfect cooperative plan. This, in turn, can discourage teams from working together, even feeding the attitude (common in the world) that perhaps no substantive cooperative action is necessary. (e.g. "If we cannot figure out how to work together on climate change, oh well. Maybe we can just focus on the economy and everything will turn out okay anyway.")

Uncertainty of results fuels the impulse for teams to pursue the most immediate and visible course to victory points: a competitive economic win. The urge to ignore the environment and compete economically is compounded by the fact that when environmental damage is first checked at the beginning of the game, it is relatively minor. This illustrates the reality of today's world that climate change has yet to have devastating effects on the countries represented in the game. In the simulation, this lack of damage encourages people to believe that the warming can be ignored in favor of ever burgeoning economies. Directing chips that could be used *now* for economic gain into the nebulous long-term results of alternative fuels research proves even more difficult for players to accept. After all, the exact effects of the potential breakthrough and the amount of research needed to make it happen are unclear and certainly far away (i.e. not seen until the end of the game).

Taken together, the lure of the immediate payoff for selfish and competitive actions, coupled with the lack of trust and the uncertainty of results, deposes player to favor a competitive stance. We suggest that this is the situation that exists in the world, and in keeping with the principle of cognitive identification, we designed the game to emulate it.

In play-tests of Red Light, Green Light, players consistently failed to overcome the obstructions to effective cooperation. The optimal approach to addressing the challenges of climate change would have been a strategy whereby all teams contented themselves with moderate economies and played the majority of their chips to fight climate change. Unfortunately, this never happened. Instead, each country usually focused most of its efforts on its economy. Turn after turn, players pursued the ghost of economic victory, even as the effects of global warming dictated dire consequences and the loss of many victory points for all teams.

Other insights from play-tests of red light, green light

Currently, our experience with Red Light, Green Light draws only from play-tests. However, based on the games that have been played, there are several insights that we think are important to note concerning both the game design and our observation of player performance in a simulation created in this manner.

1. The design of Red Light, Green Light as an expression of *game practice* vs. traditional *game theory*: Game theory research employs situations with limited choices and an isolated, certain and unchanging reality. The classic Prisoner's Dilemma is a prime example. In this exercise, two people play the Dilemma at once, isolated from the other. They are informed that they have been arrested for a crime and are being questioned. Each is told that she or he can either defect on her or his partner or remain silent. If both people remain silent, they both go to prison for five years. If both defect, they serve 10 years. If one defects while the other remains silent, the one who defects goes free (a reward for turning state's evidence) and the one who remains silent receives 15 years in jail. The players then make an independent choice, and after both players choose, the results are applied. The choice within the Prisoner's Dilemma is an isolated one since no other issues confront the players. Participants have limited and defined options (defect or remain silent), their decisions lead to guaranteed results (the number of years spent in prison) and the scenario does not evolve or change.

Red Light, Green Light, like all MIT simulations, attempts to mirror real life in which isolated, limited choice and certain unchanging scenarios are seldom found. Our attempt to design a game that sacrifices control for realism characterizes what we like to call *game practice* -games designed to represent reality as it is in practice, not theory. Accordingly, in Red Light, Green Light, as in real life, players must function in an interactive, complex and ever-changing environment

2. Game practice and the *chaos factor* of decision making: Game theory styles its problems with the assumption that participants will play as rational actors, each of whom has a dominant strategy that should logically yield him or her more benefits than any other approach. Conversely, in game practice, due to the interactive and evolving nature of the experience, no single “right” strategy for winning exists. In fact, operating in the complexity of game practice simulations, participants’ decision making processes often seem more chaotic than rational. Some of the common examples and causes of this are as follows:

Decisions made out of emotion: Human interactions form an integral part of game practice games. With these interactions come frustration and, not infrequently, anger. If people get mad or want to save face, they sometimes take actions merely to prove a point. In one play-test of Red Light, Green Light, the Chinese team threatened to stop putting any chips towards environmental reform if the United States did not devote more chips to it. When the United States did not, China did as it said and stopped working against climate change completely. The Chinese players later said that they did not want the simulation to go in that direction, but they felt they had to back up their threat.

Cognitive immaturity: Another obstacle to rational decision making in game practice surfaces because of the” abstract” nature of certain game elements, making them difficult for many players to grasp. In our play-testing we found that when making decisions, most participants tended to under weigh abstract issues in favor of more concrete concerns. Consider, for instance, that the most significant effects of climate change in Red Light, Green Light are not present at the start of the simulation, only revealing themselves decades (*turns* in game lingo) later. Players know these future aspects are *out there*, but they exist abstractly since the impact and consequences of the factors are vague and not yet happening. This, too, offers an explanation of why teams spend their chips on the instant rewards of economics as opposed to measures that would counter global warming.

Time pressure: Rarely do world leaders enjoy the luxury of having as much time as they like to arrive at their choices. Game practice mimics this by limiting the amount of time players have for making decisions each turn. Because of this, participants are more likely to make hasty or unwise choices. In simulations featuring time crunches, players often note how hard it is to get everything planned, as there is much that has to be discussed within a given team and among all of them.

Problems in communication: Sometimes the difficulty in team decision making in a game practice simulation stems not from the decision itself, but rather from a team's inability to effectively communicate. This was the case in a play-test of Red Light, Green Light, as a messenger representing the European Union, Russian and the United States teams asked the Indian team join them in putting *significant chips* towards alternative fuels research. The players on the Indian team were not aware that the aforementioned coalition had decided that "significant" meant "five." India instead devoted three chips, was roundly chastised for it and the subsequent flap forestalled any meaningful cooperation on the next turn.

Lack of complete intelligence: The same fog of war condition that we discussed as a problem for cooperation also poses difficulty for the construction of effective strategies. When all options and potential outcomes are known exactly (as is common in game theory), players can derive logical courses of action from precise calculations. Perfectly logical strategies require a perfectly logical world, and game practice harbors no such environment. Game practice, like real life, contains too many fluid and varying aspects for players to ever be "sure" about the exact consequences of their actions. The cloudy landscape of game practice scenarios strains the logical abilities of players. Not infrequently, the complexity overcomes them, and far divorced from logic, their decisions become inconsistent, even chaotic. Once again, we suggest that this may also explain what we sometimes see happening in reality.

3. The critical role of behavioral identification: We noted earlier that while affective and cognitive identification are important, they are not always enough to produce attitude change. An illustration of this condition surfaced in one of our play-tests using college students enrolled in a class centered on the study of climate change. All students in the classroom were knowledgeable about the topic and familiar with the general issues featured in the game. They knew at a cognitive level that climate change was a serious problem that needed to be redressed. But behaviorally in the game, the *informed* students did no more to deal with climate change than individuals in other play-tests. It was a classic example of people's actions not matching up with their cognitions because they had yet to experience the situation and consequences for themselves. The game allowed them to do so in a simulated manner. As a result, many expressed to the game directors a new appreciation of the necessity to *go green*.

Red light, green light: conclusion and aspirations

The early feedback from our play-tests is encouraging, but to truly evaluate the game's efficacy at altering attitudes, a formal experiment must be conducted. We believe that the chances of changing participants' attitudes are increased by a simulation like Red Light, Green Light that rejects the structured approach of game theory for the interactive and evolving environment of game practice. Operating in such a milieu is challenging. Still, we hold that the rigors of a game practice scenario are justified. The threats of climate change exist in a reality rich and intricate in its dynamics, and a simulation intended to help us find solutions must match this sophistication. If people can learn to formulate and execute successful measures against global warming within the complexity of a game practice simulation, one may reasonably hope that they can apply their learning to real life.

In single plays of the game, our play-tests subjects consistently slighted a green strategy, placing their priority on competitive and economic issues. Perhaps by playing the game repeatedly, and examining the results in a post-game debriefing, this trend can be reversed. Ideally, the game would move participants toward developing a personal awareness of the dangers of climate change and a commitment to cooperative efforts in opposing it. Our wishes in this regard are represented in the game's title, Red Light, Green Light -the *stop* and *go* colors on traffic lights. Much like the children's game of the same name, we want people to learn and believe that the world can only "go" if it is green.

References

Cherryholmes, C.H. (1966): Some current research on effectiveness of educational simulations. *American Behavioral Scientist*, 10, 4-7.

Eagly, A. H. and Chaiken, S. (1998). Attitude structure and function. In D. T.Gilbert, S. T. Fiske and G. Lindzey (eds.), *The Handbook of Social Psychology* (4th ed., Vol. 1). New York: McGraw-Hill.

Garvey, D. M. and Seiler, W.H. (1968): A study of the effectiveness of different methods of teaching international relations to high school students. In S. S. Boocock and E. O. Schild (eds.), *Simulation Games in Learning*. Beverly Hills, California: Sage Publications.

Guetzkow, H., Chadwick, F. A., Brody, R. A., Synder, R. C. and Noel, R. (1963): Simulations in international relations. Englewood Cliffs, NJ: Prentice Hall.

Intergovernmental Panel on Climate Change (2007): Summary for policymakers. http://www.mnp.nl/ipcc/pages_media/FAR4docs/final_pdfs_ar4/SPM.pdf

International Council for Science (2007): Statement. Delivered at the *UNESCO 34th GeneralConference*.http://www.icsu.org/Gestion/img/ ICSU_DOC_ DOWNLOAD / 1505_DD_FILE_StatementTR_ UNESCO_34GC_20-10-07.pdf

Joint Science Academies (2007): Joint Science Academies' statement on growth and responsibility: sustainability, energy efficiency and climate protection. Prepared for the *2007 G8 Summit*. http://www.pik-potsdam.de/members/webmaster/news-old/G8_ Academies Declaration.pdf

Leiserowitz, A. (2006): Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic Change*, 77, 45-72.

Olivas, L. and Newstrom, J.W. (1981): Learning through the use of simulation games. *Training and Development Journal*, 35(9), 63-6.

Schumacher, T.R. (1997): Simulation and attitude change: Evolving the research model. Proceedings of the *Thirtieth Hawaii International Conference on System Sciences*, 2, 648-54.

Sousa, D. A. (1995). *How the Brain Learns*. Reston, Virginia: National Association of Secondary School Principals.

Sterman, J. and Booth Sweeney, L. (2007): Understanding public complacency about climate change: Adults' mental models of climate change violate conservation of matter. *Climatic Change,* 80**,** 213-238.

Williams, R.H. (1980).:Attitude change and simulation games: The ability of a simulation game to change attitudes when structured in accordance with either the cognitive dissonance or incentive models of attitude change. *Simulation & Games: An International Journal*, 11(2), 177-96.

Williams, R. H., McCandless, P. H., Hobb, D. A. and Williams, S. A. (1986): Changing attitudes with "identification theory." *Simulation & Games: An International Journal*, 17(1), 25-43.

Williams, R.H. and Williams, A.J. (2007): In pursuit of peace: Attitudinal and behavioral change with simulations and Multiple Identification Theory. *Simulation & Gaming: An Interdisciplinary Journal of Theory, Practice & Research*, 38(4), 453-71.

Williams, R.H. and Williams, A.J. (in press): One for all and all for one: Using simulations to build cooperative attitudes and behaviors in a Middle Eastern conflict scenario. *Simulation & Gaming: An Interdisciplinary Journal of Theory, Practice & Research*.

Williams, R. H. and Williams, S. A. (1987): Level of identification as a predictor of attitude change. *Simulation & Games: An International Journal,* 18(4), 471-487.

World Meteorological Organization (2006): Statement. Delivered at the *Twelfth Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change*. http://www.wmo.int/pages/mediacentre/ documents/ SG21_ 2006_E.pdf

Alexander Jonathan Williams, graduate student in political science at the University of Kansas. He earned his B.A. from William Jewell College, majoring in political science, psychology and history. alexwilliams123@gmail.com

Robert Howard Williams, professor of psychology and history at Maple Woods College. He holds a Ph.D. in psychology and education from the University of Missouri-Kansas City, as well as Master’s degrees in psychology, counseling psychology and history from the same institution. mylifesim@gmail.com.

They are authors of “In pursuit of peace: Attitudinal and behavioral change with simulations and Multiple Identification Theory”, 2007 and “One for all and all for one: Using simulations to build cooperative attitudes and behaviors in a Middle Eastern conflict scenario “ (in press).

Address: 425 East Franklin St. Liberty, MO 64068. Kansas City. EE.UU.