

Using Case–Scenarios to Determine the Perceptions of Secondary Agriculture Teachers and 4-H Youth Development Personnel Regarding Interorganizational Cooperation

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The Prisoners Dilemma (Axelrod, 1984) served as a basis for determining the levels of cooperative behavior secondary agriculture teachers and 4-H youth development Extension personnel exhibited in response to two case–scenarios. Additionally, the study sought to determine if the interorganizational cooperation was positively or negatively interdependent. A simple random sample (n = 210) was taken from secondary agriculture teachers (N = 414) in Missouri and a census of 4-H youth development personnel (N = 91) employed by the University of Missouri Extension was taken at the time of this study. A mixed–mode design was implemented for data collection, which was accomplished using mailed and electronic questionnaires. Responses to the two case–scenarios indicated levels of cooperation varied depending on the context of the situation. The existence or absence of competition also appeared to shift the level of cooperation to or from pure cooperation. In addition, the cooperative behaviors of secondary agriculture teachers and 4-H youth development personnel differed regarding the level of cooperation desired, thereby affecting whether interdependence was positive or negative.

Keywords: cooperation; 4-H youth development personnel; secondary agriculture teachers

Introduction

In cooperative or competitive situations, one's focus is usually on the goal, outcome, or reward sought. Without a goal, outcome, or reward, interdependence is unlikely; thus diminishing any reason to cooperate or compete (Johnson & Johnson, 2009). One example of a situation allowing for cooperation or competition is the relationship of secondary agriculture teachers and 4-H youth development personnel. The Smith–Hughes Act and the Smith–Lever Act funded two separate educational systems; despite that, the federal government supported both systems, and both addressed the need for educating people in agriculture (Lemons, 1958). Both educational programs have experienced substantial changes since their founding. However, both educational systems remain responsible for the

dissemination of agricultural information to people, many of which are involved in both organizations because both organizations often exist in the same communities. Similarities are identified in the Smith–Hughes and Smith–Lever Acts regarding the roles of agriculture teachers and Extension personnel. Few have argued that each program approaches their role in educating the people in different ways (formal versus nonformal) both programs nevertheless are types of agricultural educators.

The mere existence of the numerous cooperative agreements and memoranda suggest that states and the federal government have acknowledged that cooperation between the Extension agents and agriculture teachers is important and must be clarified. Despite the importance of this premise, most of the supporting evidence has been drawn from research conducted regarding business and

industry. Kogut (1989) noted, “competitive conflicts disturb the stability of the cooperative agreement” (p. 183). Joint ventures or partnerships are frequently unstable; furthermore, stability can only be promoted by the potential to reciprocate (Kogut, 1989). Mohr and Spekman (1994) suggested that partnerships are formed to achieve a set of goals. Therefore, clarification is necessary to determine appropriate levels of cooperation between agriculture teachers and Extension agents.

The significance of cooperation between secondary agriculture teachers and 4-H youth development personnel is not a new phenomenon and has been noted in many studies (Bruce & Ricketts, 2008; Buddle, 1981; Diatta & Luft, 1986; Grage, Place, & Ricketts, 2004; Lemons, 1958; Omar, 1963; Ricketts & Place, 2005; Smith, 1966). Over a span of time exceeding 70 years, no less than 17 studies have been conducted in at least 13 states regarding the status of cooperation between secondary agriculture teachers and 4-H youth development Extension personnel. These studies have demonstrated that relationships between secondary agriculture educators and 4-H youth development personnel vary among states.

Theoretical Framework

A specific theoretical framework directly pertaining to cooperation by secondary agriculture teachers and county Extension personnel does not exist. However, numerous theoretical frameworks related to cooperation (Axelrod, 1984; Barash, 2003; Deutsch, 1958; Johnson & Johnson, 2009; Jones & George, 1998; Poundstone, 1992; West, Tjosvold, & Smith, 2003) may be used to determine the extent of cooperation between the two organizations. For this study the Prisoner’s Dilemma (Axelrod, 1984), a form of game theory, best served as the framework. “Game theory is a study of conflict between thoughtful and potentially deceitful opponents” (Poundstone, 1992, p. 6). Axelrod (1997) suggested, “the Prisoner’s Dilemma is an elegant embodiment of the problem of achieving mutual cooperation, and therefore provides the basis for analysis” (p. 15). Axelrod (1984) noted that continual interaction between the same

individuals was imperative. He suggested that the continuing interaction was what allowed for stability in cooperation based on reciprocity.

Axelrod (1984) developed a matrix to demonstrate the possible outcomes of the Prisoner’s Dilemma (see Figure 1). Among two players seeking cooperation, one player is a column player; the other is a row player, both in reference to the position from which they choose. Both players make their choices simultaneously, and unaware of the choice the other player is making. Together, the choices result in one of the four possibilities. If both players cooperate with each other, they will receive the highest outcome. Should the players mutually defect, choosing not to cooperate with each other, they will equally receive a poor outcome. However, should one player cooperate and the other player defect (give-and-take relationship), the player who defects will take all of the reward, leaving the player who cooperated with nothing. Figure 1 illustrates Axelrod’s Prisoners’ Dilemma Payoff concept.

This study utilized the theoretical strategies specific to social cooperation. Axelrod (1984) listed three simple strategies of playing the Prisoner’s Dilemma were observed in his classroom experiments when individuals were unaware of the other individual’s decisions; always defect, always cooperate, and cooperate or defect at random. Poundstone (1992) provided explanation of each of Axelrod’s theoretical strategies. Always defecting was the safest strategy and required constantly taking advantage of the other individual by defecting. Always cooperating offered the greatest advantage to all individuals assuming that all individuals were willing to cooperate all of the time. If an individual were to defect at any time, the cooperating individual would suffer a loss while the defecting individual experienced a greater gain. Cooperating or defecting at random was not a systematic approach to Prisoner’s Dilemma, yet, it was one of Axelrod’s theoretical possibilities. Poundstone acknowledged that the previously stated theoretical strategies were not likely because continual interaction would most likely cause an individual to make changes to their strategy or establish reciprocity.

		Column Player (P_1)	
		Cooperate	Defect
Row Player (P_2)	Cooperate	P_1 Reward = + 3, P_2 Reward = + 3 Reward for mutual cooperation	P_1 = Take + 3, P_2 Give = 0 Give-and-take Relationship
	Defect	P_1 Give = 0, P_2 Take = + 3 Give-and-take Relationship	P_1 Reward = 0, P_2 Reward = 0 Punishment for mutual defection

Figure 1. Four possible outcomes may result from choices made according to *The Prisoner’s Dilemma* (Axelrod, 1984).

An additional theoretical strategy was developed as part of a game theory strategy tournament held by Axelrod in 1980 (Poundstone, 1992). “TIT FOR TAT,” also referred to as *give-and-take*, was developed by Rapoport and is a strategy suggested to work well with human subjects (Axelrod, 1984). Axelrod suggested that “mutual cooperation can be stable if the future is sufficiently important relative to the present” (p. 126). Give-and-take begins with providing the other individual the opportunity to cooperate, then, each individual is given the opportunity to reciprocate that decision by acting according to the previous decision made by the other individual (Poundstone, 1992). A give-and-take relationship can also be set up for exploitation; however, the result will not be as prosperous as mutual cooperation (Axelrod, 1984). To setup a give-and-take relationship for exploitation, individuals must agree to be partners and allow alternation of exploitation. Poundstone suggested that an alternating exploitation of give-and-take operates on a slightly altered version of the golden rule: “Do unto others as you would have them do unto you—or else!” (p. 240).

Deutsch (2003) argued that game theory offered social scientists a quantitative method of determining the mixture of cooperation and competition about conflicts. Deutsch’s theory of cooperation and competition has two premises, one relates to the type of interdependence among goals of the people involved in a given situation, the other pertains to the type of action taken by the people involved (Deutsch, 2000). When there is interdependence, entities will pursue goals in their own self-interest (Tjosvold, West, & Smith, 2003). However, their interaction depends on their belief in how their goals are

related and their interaction determines the outcome (Tjosvold, et al., 2003).

Deutsch (2000) proposed two types of goal interdependence: positive and negative. He explained that positive goal interdependence will result in mutual benefit or loss, whereas negative interdependence will result in one person or organization reaping benefit, while the other suffers loss. Deutsch offered a sink or swim analogy to illustrate the differences between positive and negative interdependence. As he described, positive interdependence occurs when entities involved will either swim together (mutually benefiting) or sink together (mutually suffering). Conversely, negative interdependence occurs when one entity swims (independently reaping benefit) while the other entity sinks (independently suffering loss).

Purpose and Research Objectives

A review of the literature indicated that ambiguity exists regarding cooperative behavior within the findings of similar studies (Boyle, 1958; Bruce & Ricketts, 2008; Bryant, 1965; Buddle, 1981; Diatta & Luft, 1986; Grage, et al., 2004; Lemons, 1958; Omar, 1963; Ricketts & Place, 2005; Schroeder & Moss, 1984; Smith, 1966). Additionally, the studies did not investigate the level and extent of cooperative behavior, nor did they investigate if the cooperation that was present was positively or negatively interdependent. Therefore, the purpose of this study was to describe the perceptions of secondary agriculture teachers and 4-H youth development personnel regarding cooperation using case-scenarios, guided by the following research objectives:

1. Describe the levels of cooperative behaviors (cooperate, give-and-take, defect) secondary agriculture teachers and 4-H youth development Extension personnel exhibit.
2. Describe the cooperative behaviors (cooperate, give-and-take, defect) between secondary agriculture teachers and 4-H youth development Extension personnel as positively or negatively interdependent.

Procedures

As part of a larger study, the research design of this quantitative study was descriptive in nature. The overarching construct of this study was to measure perceptions of secondary agriculture teachers and 4-H youth development personnel in Missouri regarding interorganizational cooperation. The target population for this study was secondary agriculture education teachers and 4-H youth development personnel in Missouri. In the spring of 2008, a simple random sample (Krejcie & Morgan, 1970) of 210 secondary agriculture teachers ($N = 414$) were chosen to participate from the 2007–2008 *Missouri Agricultural Education Directory*. The University of Missouri Extension *Directory of Offices and Employees*, included 108 4-H youth specialists, 4-H youth educators, 4-H youth associates, or 4-H youth assistants who were employed by the University Extension at the time that the Directory was accessed. State-level 4-H youth specialists were excluded from the study because their professional responsibilities to the entire state would presumably not allow them opportunities to exercise cooperative behaviors in the same capacity as regional and county Extension personnel. Due to the relatively small number of subjects, a census ($N = 91$) was taken to more accurately describe the characteristics of the population and eliminate potential errors associated with subject selection and sampling.

The data collection instrument used in this study was researcher developed for a larger study. The portion of the instrument related to the objectives of this study sought to measure each subjects' cooperative behavior using context specific, case-scenarios. Two case-scenarios were developed to determine the type of cooperative behavior (cooperate, give-and-take, or defect) subjects would demonstrate if

they were in each case-scenario situation. Specifically, the case-scenarios were selected to determine how available resources directly affect levels of cooperation. For each case-scenario, four six-point summated rating scale responses (1 = Not Likely to 6 = Very Likely), were provided to gauge each subject's willingness to cooperate in relation to the Prisoner's Dilemma matrix.

In similar studies (Bryant, 1965; Grage, et al., 2004), competition at county fairs was noted as often being an influential factor in determining the level of cooperation between agriculture teachers and Extension agents. Hence, the first case-scenario was developed to depict a hypothetical situation at a fictitious county fair. The following context specific case-scenarios were presented to secondary agriculture teachers and 4-H youth development personnel in their respective questionnaire. The first case-scenario described a junior livestock auction at a county fair and asked subjects to respond to the fair board requesting the subjects' input on sale order.

Scenario 1, Context: County Fair

The sale order of the Junior Livestock Auction at the county fair is under review by the fair board. The fair board has decided to review the sale order policy because the sale prices are higher at the beginning of the auction when most of the buyers are present and have the most money to spend. You know that the prices at the beginning of the sale are much higher, but it has been a long-time tradition that FFA members are first in the sale order, followed by the 4-H members. The fair board has asked for your input.

The sale order of the Junior Livestock Auction at the county fair is under review by the fair board. The fair board has decided to review the sale order policy because the sale prices are higher at the beginning of the auction when most of the buyers are present and have the most money to spend. You know that the prices at the beginning of the sale are much higher, but it has been a long-time tradition that 4-H members are first in the sale order, followed by the FFA members. The fair board has asked for your input.

Previous studies (Buddle, 1981; Grage, et al., 2004; Schroeder & Moss, 1984; Smith, 1966) suggested that cooperation might be affected when resources such as facilities are a factor. Therefore, the second case-scenario was developed to depict a hypothetical situation regarding donated facilities. The second case-scenario described a 20 acre farm that was donated to the subjects' counterpart's program (high school agricultural education department or county Extension office) and asked each subject to determine the extent to which they would be willing to help their counterpart. The following context specific case-scenarios were presented to secondary agriculture teachers' and 4-H youth development personnel's roles to determine the level of cooperation they would exhibit when serving as youth educators.

Scenario 2, Context: Donated Land Laboratory

The county Extension agent has received a donation of a nearby 20-acre farm. Prior to being donated to the County Extension Office, the farm was vacant for a year. The barn is in good condition, but it needs a coat of paint, the fences around the pasture need mending, and some of the boards on the corrals need to be replaced. The Extension agent and her 4-H members do not have the tools or equipment to repair the farm so she has approached you. Your school does have all of the necessary tools and equipment, and you have enough FFA members with the experience necessary to safely use them.

The high school agriculture teacher has received a donation of a nearby 20-acre farm. Prior to being donated to the high school agricultural education program, the farm was vacant for a year. The barn is in good condition, but it needs a coat of paint, the fences around the pasture need mending, and some of the boards on the corrals need to be replaced. The agriculture teacher and her FFA members do not have the tools or equipment to repair the farm so she has approached you. Between the Extension office and your volunteers, you have all of the necessary tools and equipment, as well as enough 4-H members and volunteers with the experience necessary to safely use them.

This study implemented a mixed-mode design as referenced by Dillman (2007) by

providing subjects with a mailed questionnaire, followed by an electronic questionnaire in the sequence order suggested by Converse, Wolfe, Huang, and Oswald (2008). Providing subjects with the option of choosing which mode of responding had shown to have little effect on the response rate (Converse, et al., 2008). Therefore, all correspondence sent to subjects, with the exception of the cover letter in the first mail questionnaire packet, included both options of responding: by mail questionnaire or a Web-based electronic questionnaire.

Dillman (2007) suggested that self-administered questionnaires be constructed in an easy to understand and answer manner. Therefore, to address the potential issue of clarity for each population (secondary agriculture teachers and 4-H youth development personnel), two versions of the questionnaire were developed. The questionnaires were near identical in format and construction; however, each case-scenario and question was reworded to apply to the subject receiving the questionnaire to avoid confusion.

Face validity and content validity of the data collection instrument were determined by a panel of eight experts: four of whom were faculty members from the University of Missouri, Department of Agricultural Education and four faculty members from the University of Missouri Extension Service. Dillman's (2007) unimode construction principles were followed when creating the electronic version of the questionnaire to reduce the possibility of inconsistencies in responses due to mixed-mode data collection. The electronic version of the questionnaire was created and distributed to the same panel of experts using Web-hosted software provided by Hosted Survey™ to reassess face validity of the instrument in its electronic form.

The reliability of the instrument was determined by conducting a pilot test using individuals with similar characteristics of secondary agriculture teachers in the sample population and the 4-H youth development personnel. In this case, secondary agriculture teachers not selected to comprise the sample ($n = 204$) and 4-H agents in the neighboring state of Kansas. The electronic version of the secondary agriculture teacher questionnaire was distributed by e-mail using the Hosted Survey™ software. Reliability of each instrument was

determined using the same statistical methods for both versions of the instrument. The two case–scenarios could be described as non–summable items; therefore, a test–retest method of determining reliability was utilized. Twenty–nine (69%) responses were received from the agriculture teachers and 32 (78%) responses were received from the Kansas 4-H

agents who were invited to participate in the second administration of the case–scenario section of the questionnaire. SPSS® version 15.0 for Windows™ platform computers was used to determine the coefficient of stability by comparing the responses from the initial administration to the responses from the second administration (see Table 1).

Table 1

Test–Retest Measures of Reliability for Secondary Agriculture Teacher Questionnaire (n = 29) and 4-H Youth Development Personnel Questionnaire (n = 25)

Case–Scenario	<i>r</i> Question 1	<i>r</i> Question 2	<i>r</i> Question 3	<i>r</i> Question 4
Scenario 1: <i>County Fair</i>				
Secondary Agriculture Teachers	0.83	0.73	0.77	0.72
4-H Youth Development Personnel	0.96	0.83	0.82	0.88
Scenario 2: <i>Land Lab</i>				
Secondary Agriculture Teachers	0.95	0.88	0.95	0.82
4-H Youth Development Personnel	0.88	0.83	0.93	0.93

This study followed the data collection protocol suggested by Dillman (2007). However, the communication medium suggested by Converse et al. (2008) deviated from the methods described by Dillman, primarily in the medium used to correspond with and provide questionnaires to respondents and nonrespondents. The first mail questionnaire packet included one cover letter, one paper questionnaire with a \$1 incentive attached to the cover of the booklet–type paper questionnaire, and one pre–addressed envelope with a first–class stamp pre–applied to the envelope. An e–mail reminder was sent to all secondary agriculture teachers and 4-H youth development personnel who had not yet responded, six days after the first mail–questionnaire packets were mailed. An additional complete e–mail message containing a link to the Web–based electronic questionnaire was sent to nonrespondents six days after the previous reminder message was sent. A response rate of 65% ($n = 136$) was obtained for secondary agriculture teachers; whereas, the response rate for 4-H youth development personnel was 73% ($n = 66$).

Non–response error was a relevant concern; therefore, procedures for handling nonrespondents were followed as outlined in Miller and Smith (1983). A list of secondary agriculture teacher nonrespondents was compiled and a simple random sample of 25%

of nonrespondents was taken from the list. An additional questionnaire packet was assembled and sent to the nonrespondent sample ($n = 20$) of secondary agriculture teachers, followed by two more points of contact. Seven days after the second mail questionnaire packets were mailed, an additional e–mail reminder was sent to each of the agriculture teachers who had not yet responded in an effort to maximize response rate. Twenty 4-H youth development personnel had not responded seven days after the second complete e–mail was sent. Due to the relatively high response rate of the initial data collection attempt, 4-H youth development personnel who had not yet responded were determined to be nonrespondents and were sent an additional mail questionnaire packet. The content, format, and construction of the paper questionnaire were unaltered; however, no incentive was included in the second packet.

Respondent data from each paper questionnaire were manually entered into a Microsoft Excel spreadsheet, whereas, respondent data from each electronic questionnaire were downloaded from the Hosted Survey™ website in a .txt form document, and then imported into to a Microsoft Excel spreadsheet. Data were analyzed using SPSS® version 15.0 for Windows™ platform computers. In determining the appropriate analysis of the data, the primary guidance was

scales of measurement as outlined by Ary, Jacobs, Razavieh, and Sorensen (2006).

Respondent and nonrespondent data were compared using an independent samples *t*-test to compare the variables of interest—cooperate, give-and-take, defect—between respondents and nonrespondents. No significant differences ($p > .05$) existed between respondent and nonrespondent data for secondary agriculture teachers or 4-H youth development personnel. Hence, the nonrespondent data were pooled with respondent data yielding a 69% ($n = 143$) secondary agriculture teachers and 82% ($n = 75$) 4-H youth development personnel.

Findings

The findings presented were part of a larger study undertaken to determine the perceptions of cooperation between secondary agriculture teachers and 4-H youth development personnel. The first research objective sought to determine

which levels of cooperative behavior—cooperate, give-and-take, defect—secondary agriculture teachers and 4-H youth development personnel exhibit. Data from each six-point summated rating scale question (1 = Not Likely; 6 = Very Likely) related to case-scenario one were collapsed into dichotomous groupings (1, 2, 3 = Not Likely and 4, 5, 6 = Likely). The relative similarity of the summed *likely* percentages of secondary agriculture teachers and 4-H youth development personnel are illustrated in Figure 2. Secondary agriculture teachers and 4-H youth development personnel are far more likely to choose a give-and-take level of cooperation, indicating a *give-and-take* relationship, than they are to cooperate or defect. Furthermore, differences existed in levels of cooperative behavior relative to the option of giving first (TIT FOR TAT 1°) in a give-and-take relationship versus giving second (TIT FOR TAT 2°).

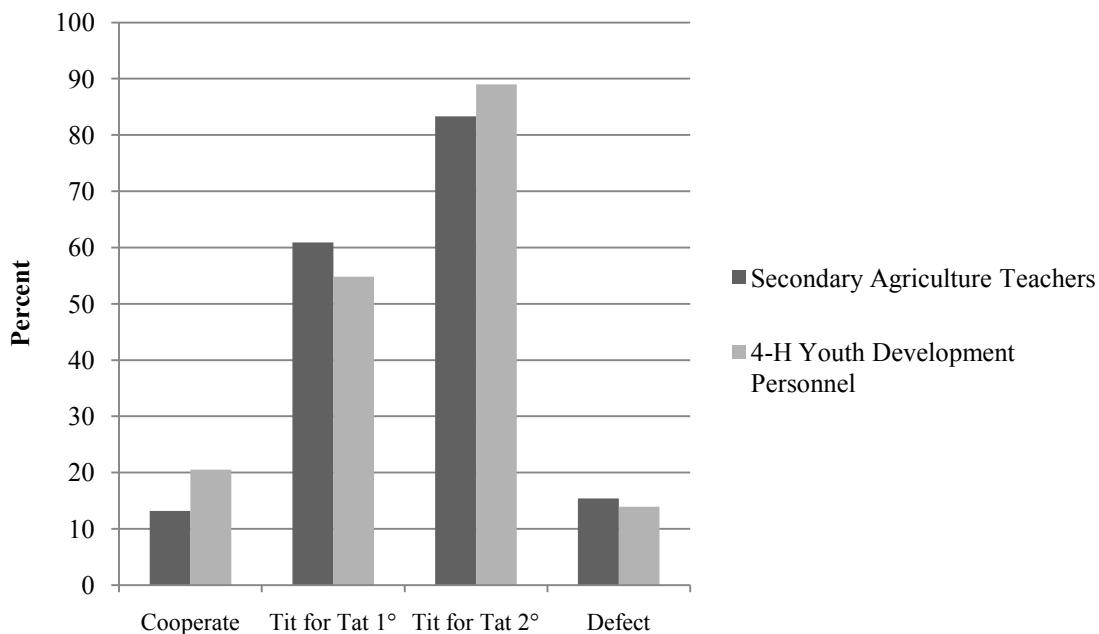


Figure 2. Levels of likelihood of cooperative behavior of secondary agriculture teachers and 4-H youth development personnel in a competitive situation.

Frequency and percentages for each level of cooperative behavior (cooperate, give-and-take, and defect) of secondary agriculture teachers (see Table 2) and 4-H youth development personnel (see Table 3) based on the Prisoner's

Dilemma in regard to the county fair case scenario are reported.

Table 4
Agriculture Teachers' Cooperative Behavior, Case Study Scenario 1 – County Fair (n = 143)

Behavior	Likelihood											
	Not Likely 1		2		3		4		5		Very Likely 6	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Cooperate	70	49.0	27	18.9	27	18.9	12	8.3	5	3.5	2	1.4
Tit for Tat 1°	32	22.4	9	6.3	15	10.5	17	11.9	29	20.3	41	28.7
Tit for Tat 2°	11	7.7	5	3.5	7	4.9	10	7.0	31	21.7	79	55.2
Defect	56	39.2	40	28.0	25	17.5	11	7.7	7	4.9	4	2.8

Note. Tit for Tat 1° = give first; Tit for Tat 2° = give second

Table 5
4-H Youth Development Personnel's Cooperative Behavior, Case Study Scenario 1 – County Fair (n = 73)

Behavior:	Likelihood											
	Not Likely 1		2		3		4		5		Very Likely 6	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%
Cooperate	35	47.9	13	17.8	10	13.7	6	8.2	4	5.5	5	6.8
Tit for Tat 1°	18	24.7	2	8.2	9	12.3	6	8.2	10	13.7	24	32.9
Tit for Tat 2°	3	4.1	0	0.0	5	6.8	4	5.5	16	21.9	45	61.6
Defect	42	58.3	14	19.4	6	8.3	7	9.7	1	1.4	2	2.8

Note. Tit for Tat 1° = give first; Tit for Tat 2° = give second

The data from each six-point summated rating scale question (1 = Not Likely; 6 = Very Likely) related to the land laboratory case-scenario were collapsed into dichotomous groupings (1, 2, 3 = Not Likely and 4, 5, 6 = Likely). Secondary agriculture teachers and 4-H youth development personnel were more likely to choose the *cooperate* level of cooperative behavior when competition is removed from the situation. Additionally, secondary agriculture

teachers and 4-H youth development personnel were more likely to choose the *give-and-take* level of cooperative behavior when they are giving second (TIT FOR TAT 2°). Nevertheless, all three levels of cooperation in regard to the Prisoner's Dilemma—cooperate, give-and-take, defect—were present. The similar summed *likely* percentages of secondary agriculture teachers and 4-H youth development personnel are illustrated in Figure 3.

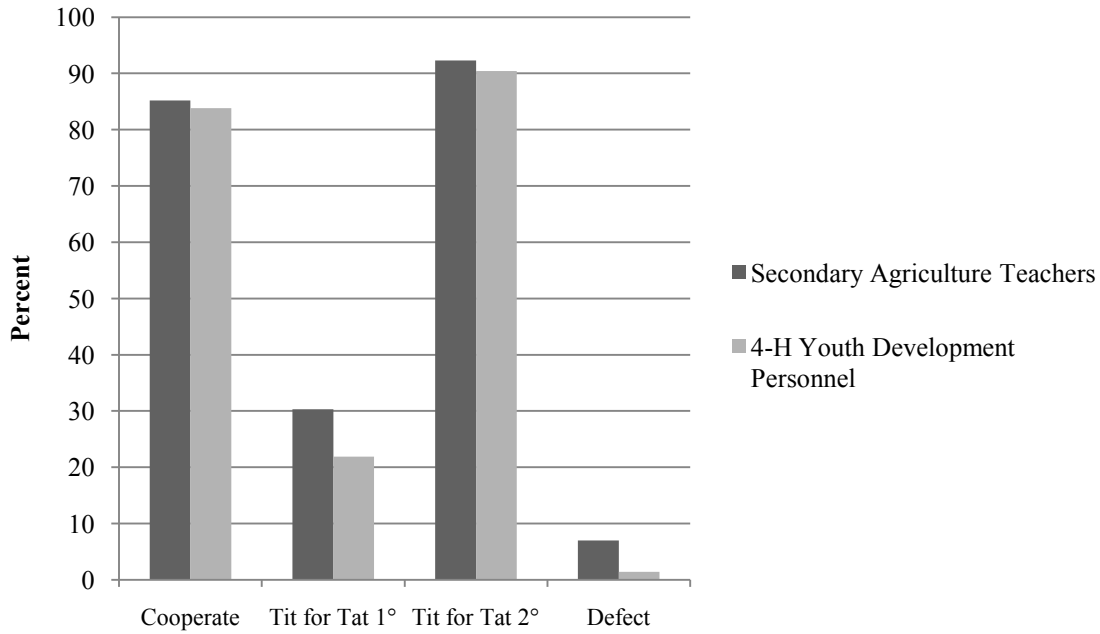


Figure 3. Levels of likelihood of cooperative behavior of secondary agriculture teachers and 4-H youth development personnel in a facility-sharing situation.

Frequency and percentages for each level of cooperative behavior—cooperate, give-and-take, defect—of secondary agriculture teachers (see Table 3) and 4-H youth development

personnel (see Table 4) based on the Prisoner’s Dilemma in regard to the county fair case-scenario are reported.

Table 3
Agriculture Teachers’ Cooperative Behavior Case Study Scenario 2 – Land Lab (n = 143)

Behavior	Likelihood													
	Not Likely		1		2		3		4		5		Very Likely	
	f	%	f	%	f	%	f	%	f	%	f	%		
Cooperate	2	1.4	5	3.5	14	9.9	19	13.4	50	35.2	52	36.6		
Tit for Tat 1°	40	28.2	55	38.7	17	12.0	17	12.0	16	11.3	10	7.0		
Tit for Tat 2°	3	2.1	3	2.1	5	3.5	16	11.3	49	34.5	66	46.5		
Defect	78	54.9	45	31.7	9	6.3	5	3.5	4	2.8	1	0.7		

Note. Tit for Tat 1° = give first; Tit for Tat 2° = give second

Table 4
4-H Youth Development Personnel's Cooperative Behavior, Case Study Scenario 2 – Land Lab (n = 74)

Behavior:	Likelihood													
	Not Likely		1		2		3		4		5		Very Likely	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%		
Cooperate	4	5.4	4	5.4	4	5.4	18	24.3	19	25.7	25	33.8		
Tit for Tat 1°	20	27.4	19	26.0	18	24.7	12	16.4	4	5.5	0	0.0		
Tit for Tat 2°	2	2.7	0	0.0	5	6.8	13	17.8	21	28.8	32	43.8		
Defect	54	73.0	11	14.9	8	10.8	1	1.4	0	0.0	0	0.0		

Note. Tit for Tat 1° = give first; Tit for Tat 2° = give second

Secondary agriculture teachers and 4-H youth development personnel exhibited all three levels of cooperation—cooperate, give-and-take, defect—in relation to the Prisoner's Dilemma matrix. Responses to the two case-scenarios indicated levels of cooperation varied depending on the context of the situation. Cooperation was more likely to occur at the *give-and-take* level when competition was a factor (e.g. scenario 1); whereas, secondary agriculture teachers and 4-H youth development personnel were more likely to cooperate when nonmonetary resources were a factor (e.g. scenario 2). Additionally, in each of the summed likely figures, interdependence was depicted as positive based on the greater presence of cooperative and give-and-take tendencies.

Conclusions, Implications, Recommendations

Secondary agriculture teachers and 4-H youth development personnel may not be aware that both groups are receptive to participating in all levels of cooperative relationships: *cooperate*, *give-and-take*, and *defect*. The existence or absence of competition may shift the level of cooperation to or from pure cooperation. In addition, the cooperative behaviors of secondary agriculture teachers may be affected by the resources at stake in each situation, thereby affecting whether interdependence is positive or negative. This study investigated two context-specific case-scenarios; give-and-take relationships may exist in other contexts as well. A give-and-take relationship is mutually beneficial for secondary agriculture teachers and 4-H youth development

personnel; however, the allocation of resources appeared to have some effect on cooperative behavior. If both groups are not aware that they were willing to engage in this type of relationship the likelihood of each group initiating the reciprocal relationship is reduced.

Secondary agriculture teachers and 4-H youth development personnel would benefit from the formation of a joint advisory committee of representatives from each organization, including administrators, to formulate a cooperative plan of action and create a list of suggested ways that secondary agriculture teachers and 4-H youth development personnel can interact through joint activities. Stimson (1920) suggested that conferences or committees were necessary to coordinate efforts of the federally funded agencies providing agricultural education in order to avoid overlapping and overlooking. "Good teamwork could hardly be expected in the absence of such conferences" (Stimson, 1920, p. 359). Following the spirit of Stimson's suggestions, a professional development conference should be organized by the University of Missouri Extension administration and the Missouri Department of Elementary and Secondary Education, and held annually.

The necessity to share resources would seem obvious. Bender, Cunningham, McCormick, Wolf, and Woodin (1972) suggested that, "the kind and extent of physical facilities and instructional materials available—including community resources—affect the methods of teaching that can and should be used" (p. 29). Secondary agriculture teachers should consider the resources available in the community, such as farms, greenhouses, and agriculture-related

businesses, to supplement the curriculum and use as potential laboratories (Bender, et al., 1972). Additionally, this study did not investigate whether secondary agriculture teachers and 4-H youth development personnel considered the members of their organizations to be a resource. Further research should be conducted to determine if membership is considered a resource for each organization, particularly in small communities.

Youth members of 4-H clubs and FFA chapters alike frequently look to their leaders and advisers to serve as role models. What message are secondary agriculture teachers and 4-H youth development personnel sending to the youth of their organizations if they are not able to set the example by cooperating with each other, openly communicating, or share resources? Secondary agriculture teachers and 4-H youth development personnel must be

mindful that the youth development activities that they are responsible for should begin to develop beneficial skills that youth will carry with them into adulthood.

Further research may be appropriate to determine if including other youth development organizations, such as Boy Scouts and Girl Scouts of America in joint youth development activities with 4-H and FFA would further benefit the youth members of the organizations.

A reciprocal give–and–take cooperative relationship appears to be acceptable to 4-H youth development personnel; however, it is still unclear as to how they should begin to stabilize such a relationship with secondary agriculture teachers. An even more perplexing question is: Who will have to give first in order for the other group to reciprocate, to eventually establish a mutually beneficial reciprocal give–and–take cooperative relationship?

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