

# Motivating Environmentally Responsible Behavior through Service-Learning

**Beth A. Covitt**

**National Service Fellow  
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## ABSTRACT

Motivational theories from psychology were applied to conduct a preliminary examination of the role that fulfillment of personal goals plays in the relation between environmental education programs (service-learning and field trips) and intentions to engage in environmentally responsible behaviors. SAS PROC MIXED analysis was used to test the hypothesis that motive fulfillment mediates the impact of environmental education experiences on intentions. The evidence for motive fulfillment as a mediator was mixed. Service-learning programs negatively affected or did not affect motive fulfillment. Field trips led to a high level of motive fulfillment. Evidence for a strong relation between motive fulfillment and intentions was supported. When the relation between program treatment and motive fulfillment was strong, motive fulfillment played a mediating role in the effect of program treatment on intentions. These preliminary results suggest that fulfillment of personal goals plays a significant role in whether or not students will report intentions to engage in helping behaviors after their environmental education experience. Consequently, service-learning program developers and facilitators who consciously strive to help students fulfill their goals may achieve greater success in fostering prosocial and proenvironmental behaviors.

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## EXECUTIVE SUMMARY

### Problem/Research Question

Although an increasing amount of research demonstrates that service-learning can positively influence prosocial or civic outcomes, few studies focus on the questions of how and why service-learning may influence these outcomes. This is particularly true for the subcategory of environmental service-learning that is interested in the civic outcome of fostering environmentally responsible behaviors (ERBs). Thus, there is currently a need to understand the relation between program design and implementation characteristics and service-learning outcomes. This relation may be addressed by considering the mechanisms (or mediating variables) through which program design and implementation influence outcomes.

One mediating factor that may help explain how service-learning influences civic outcomes is motive fulfillment, or the extent to which students are able to achieve their personal goals associated with positive psychological functioning through their service-learning experiences (e.g., Clary, Snyder, & Stukas, 1998a; Clary, et al., 1998b). A review of best practices of service-learning (Alliance for Service-learning in Educational Reform, 1995; Toole, 1999) suggest that there is a connection between quality service-learning and motivational goals such as gaining understanding/competence, autonomy, participation, and social affiliation. Furthermore, past research has shown that fulfillment of motivational goals can lead to increased commitment to civic outcomes (Clary, et al., 1998b).

Through an evaluation of the Chesapeake Bay Foundation' (CBF's) middle school environmental service-learning program, this study sought to examine whether education programs designed to foster ERBs are more successful to the extent that they support individuals' personal goals related to positive psychological functioning. It was hypothesized that students' motive fulfillment mediates the relation between educational treatment and the civic outcome of intentions to engage in ERBs.

### Methods

Sixth, seventh, and eighth grade students ( $n = 2,365$ ) and teachers ( $n = 37$ ) in Maryland and Virginia participated in this quasi-experimental pretest/posttest design study. Teachers were recruited through a combination of a mailing and phone calls to teachers trained in the use of CBF curricula or service-learning projects. The students and teachers in this study participated in various combinations of service-learning, field trips, and curricular activities. All students participated in CBF curricular activities about the Bay. There were three service-learning conditions in the study. Students either participated in no service-learning, in the CBF service-learning program called *Bay Grasses in Classes (Grasses)*, or in service-learning developed independently by their teachers.

Through pretests and posttests, data were collected concerning the motivational goals students fulfilled through their Chesapeake Bay learning experience and their intentions to help the Chesapeake Bay. The constructs included in the overall measure

of motivational fulfillment were understanding/competence goals, autonomy goals, and social affiliation goals. The SAS PROC MIXED technique was used to examine the extent to which motive fulfillment was the mechanism through which program treatment (i.e., service-learning condition) led to intentions to help the Chesapeake Bay.

## Results

For all students, motive fulfillment had a strong positive relation with intentions to help the Chesapeake Bay. The relations between the service-learning conditions and students' intentions (including the mediating role of motive fulfillment) are described below.

Motive fulfillment mediated the relation between the *Grasses* program condition and students' behavioral intentions. Students in the *Grasses* program had lower levels of motive fulfillment compared with students who did not participate in service-learning. Participation in *Grasses* changed from a nonsignificant negative to a nonsignificant positive predictor of intentions when motive fulfillment was controlled for. The negative effect of *Grasses* on motive fulfillment probably reflects the fact that the *Grasses* program does not follow important standards for quality service-learning including providing choices for students and sufficient opportunities for meaningful action and reflection. Thus, low motive fulfillment explains part of the reason why students participating in *Grasses* did not have higher intentions than students who did not participate in service-learning.

Students who participated in service-learning programs developed by their teachers did not report levels of motive fulfillment different from students not participating in service-learning. Thus, for non-CBF service-learning students, motive fulfillment did not mediate the relation between service-learning treatment and behavioral intentions. The reason why teacher developed service-learning did not lead to different levels of motive fulfillment than no service-learning is likely because the teacher developed service-learning experiences reflected a range of quality in terms of following service-learning best practices. Considered as a whole, students who participated in service-learning designed by their teachers were not different from students who did not participate in service-learning in either motive fulfillment or intentions.

In summary, the two service-learning programs examined in this study did not have consistent effects on motive fulfillment or significant effects on intentions. Motive fulfillment, however, had a consistently strong relation with students' intentions to help the Bay. This suggests that although motive fulfillment is a promising mediator for understanding how and why educational programs may lead to civic outcomes, the broad category of service-learning program may not be specific enough to capture the essence of what is leading to motive fulfillment and intentions.

## Discussion

The strong relation between motive fulfillment and intentions suggests that motive fulfillment is a good candidate to explain the relation between educational experience and continuing intentions and civic commitments. However, the education

program categories examined in this study did not effectively capture the cause of students' differences in reported motive fulfillment. Therefore, a more useful approach may be to examine specific program characteristics to determine how they relate to motive fulfillment and civic outcomes. This information could then be used to determine which combinations of program characteristics would be most effective in influencing desired service-learning outcomes.

Based on an examination of the service-learning programs included in this study, the following program characteristics would be appropriate to examine in the context of a motive focused evaluation.

To what extent:

- are students involved in choosing a service-learning topic?
- are students involved in planning their service-learning project?
- are students involved in service-learning that is relevant to their lives?
- do students have opportunities to develop collegial relationships with adults and peers during their experiences?

This study found that many teachers were not engaging their students in service-learning experiences that reflect best practices. This may be due to the fact that some standards for quality service-learning (Alliance for Service-learning in Educational Reform, 1995; Toole, 1999) reflect new and potentially difficult practices for teachers to adopt (e.g., handing control and decision-making over to students). Although service-learning has been widely implemented in schools across the nation, the quality of this service-learning is uneven. At this point, further research supporting the connection between service-learning program design and implementation characteristics and outcomes is needed. Without this evidence, it may be difficult to convince schools and teachers that the program characteristics that can be difficult or intimidating to implement at the outset are also likely to be key to the success of a program.

An understanding of why these program characteristics are so important (e.g., because they help students fulfill fundamental goals) can also help program designers and teachers understand that simply engaging students in service that is connected to learning may not be sufficient for developing a lasting civic commitment in students. Continuing research to gain a deeper understanding of the relations between program characteristics, motive fulfillment, and outcomes like continuing civic behaviors can help service-learning program developers and teachers create and implement more effective service-learning experiences for students. Empirical evidence concerning "how and why" service-learning works can help to ensure that *effective* service-learning, as opposed to *any* service-learning, will be integrated into educational programs on a national scale.

## INTRODUCTION

In recent years, service-learning has become an increasingly popular pedagogical method among environmental educators (Ward, 1999). This increase is likely due to the close match between environmental education (EE) goals and service-learning goals. The primary goal of EE is to provide people with the awareness, knowledge, attitudes, skills, and motivations to solve environmental problems (Tbilisi Intergovernmental Conference on Environmental Education, 1978). Outcomes sought through service-learning include enhancing learning, promoting personal development of values and self-efficacy, fostering civic responsibility, and serving communities (Waterman, 1997). Thus, EE and service-learning share not only the cognitive goal of promoting learning and knowledge, but also the behavioral goal of fostering prosocial and proenvironmental actions.

Research over the past decade has provided growing bodies of evidence that service-learning can positively influence prosocial, or civic, outcomes. Studies have found that students who participate in service-learning may develop higher levels of civic responsibility and willingness to become involved in community service (e.g., Furco, 2002; Melchior & Bailis, 2002; Weiler, LaGoy, Crane, & Rovner, 1998). Studies of environmental service-learning and similar environmental education programs that emphasize real world environmental problem-solving have also found positive outcomes for increasing environmental responsibility and commitments (e.g., Holt, 1988; Lieberman & Hoody, 1998; Ramsey, Hungerford, & Tomera 1981; Ramsey, 1987).

Because service-learning programs may vary greatly in design and implementation, studies that focus solely on the outcomes of service-learning may not provide program developers and practitioners with sufficient information for creating and improving their programs. Fewer studies have focused on the important questions of how and why service-learning influences civic outcomes. In a recent book chapter, Melchior and Bailis (2002) suggested that researchers should focus on program design and implementation as well as considering the outcomes fostered through service-learning.

It is also instructive to consider the mechanisms (or mediating variables) through which these characteristics influence service-learning outcomes. An understanding of mediating mechanisms can provide a guide for determining which combinations of service-learning program characteristics will be most successful for fostering positive outcomes. One mediating factor that may help explain how service-learning influences civic outcomes is motive fulfillment, or the extent to which students are able to achieve their personal goals associated with positive psychological functioning through their service-learning experiences (e.g., Clary, Snyder, & Stukas, 1998a; Clary, et al., 1998b).

Motive fulfillment is a good candidate for mediating the relation between service-learning programs and service-learning outcomes for several reasons. First, a consideration of standards for quality service-learning demonstrates that there are many connections between service-learning best practices and psychological motives including competence, autonomy, and social affiliation. For example, the service-learning standard that students should be involved in planning service-learning activities (Alliance for

Service-learning in Education Reform, 1995; Toole, 1999) connects with the psychological goal of autonomy (e.g., Allen, Kuperminc, Philiber, & Herre, 1994; Deci & Ryan, 1980; Stukas, Snyder, & Clary, 1999). Establishing autonomy is thought to be a central process of adolescent development (Allen, et al., 1994).

In addition to evidence that quality service-learning standards relate to students' motives, there is also theory and research supporting that motive fulfillment is related to civic outcomes. Studies in both personality and cognitive psychology suggest that one key factor for fostering environmentally and socially responsible behaviors is a consideration of the personal goals or motives that individuals fulfill through engaging in these behaviors (Clary, et al., 1998b; Kaplan, 2000).

Although motive fulfillment is a good candidate to mediate the effect of service-learning programs on civic outcomes, little research has directly tested this mediation pattern (e.g., Allen, et al., 1994). Therefore, through an evaluation of a middle school environmental service-learning program, this study addresses the proposition that education programs designed to foster environmentally responsible behaviors (ERBs) will be more successful to the extent that they support individuals' personal goals related to positive psychological functioning and well-being.

The context for this study is an evaluation of the Chesapeake Bay Foundation's (CBF's) middle school education programs. CBF is a non-profit environmental organization headquartered in Maryland that conducts restoration of and education about the Chesapeake Bay. As part of their education program offerings, CBF provides three types of Bay learning experiences for middle school teachers and students. These include (1) CBF staff-run field trips, (2) curricular materials and teacher training, and (3) CBF-supported environmental service-learning programs. This study places particular emphasis on the relative ability of CBF environmental service-learning and other CBF EE programs to fulfill students' personal goals, and subsequently, to foster intentions to engage in ERBs.

## TWO THEORIES RELATING MOTIVES AND PROSOCIAL BEHAVIORS

One way to consider the role of personal motivation in fostering ERB is presented in social psychologists Clary and colleagues' (1998b) functional approach to motivations for volunteering. The functional approach suggests that individuals engage in service behaviors because service fulfills multiple and differing psychological functions (or goals) for different individuals (Clary, et al., 1998b). Fostering service behaviors is particularly applicable to the topic of service-learning, which is concerned with students' continuing prosocial or proenvironmental behaviors after they complete a service experience. A major predictive postulate of the functional approach is that motivation will be enhanced to the extent that persuasive appeals and/or service experiences match participants' goals (Clary, et al., 1998b).

Through studies of individuals engaging in service (e.g., Clary, et al., 1998b; Omoto & Snyder, 1995; Chapman & Morley, 1999), researchers have identified six motivational goals served by volunteerism: values, understanding, social, career, protective, and enhancement. Clary, et al. (1998b) measured these six goals with the Volunteer Functions Index scale. They assessed the reliability and validity of their scale through exploratory and confirmatory factor analyses and through cross-validation with multiple populations. The postulate that motivation will be enhanced to the extent that persuasive appeals and/or service experiences match participants' goals has been supported by several studies (e.g., Clary, Snyder, Ridge, Miene, & Haugen, 1994; Stukas, et al., 1999). Although there are many similarities and connections, no studies have examined the functional approach to motivation in the context of service-learning.

Kaplan (2000) presents another perspective concerning fostering environmentally responsible behavior in his evolutionary/cognitive/motivational reasonable person model. Kaplan (2000, pp. 497-8) suggests that, “[b]y recognizing human inclinations and the circumstances that are supportive of human motivations, it may be easier to get people to behave in environmentally responsible ways without calling on guilt or sacrifice.” Kaplan and Kaplan (1989) identify three basic human motives which, if supported, may help to foster ERB. These include motivation to “understand what is going on” and to avoid confusion, motivation to be a self-directed learner and explorer, and motivation to be an active participant rather than a helpless person in the world (Kaplan, 2000).

This description of the reasonable person theory sheds light on how the theory can relate to environmental service-learning. First, it is possible to highlight how service-learning pedagogy matches the reasonable person theory. For example, by combining academic learning with community service, service-learning emphasizes both understanding and participation. In addition, the reasonable person theory can provide insight into how service-learning programs can be intentionally structured to support basic motives. For example, preference for self-guided learning can be supported with some level of exploration or role autonomy in service-learning experiences and preference for participation can be supported through engaging students in meaningful rather than menial service roles.

The goal of fostering civic outcomes is not easy to achieve, as evidenced by some service-learning programs that demonstrated no civic improvements (e.g., Ford, 1995). If environmental educators and service-learning practitioners are to achieve this difficult goal, they will need a deep understanding of the processes by which these educational programs and pedagogies lead to positive outcomes (Allen, et al., 1994). In the functional approach to motivation and the reasonable person model, we find two approaches with direct relevance to service-learning and EE.

By testing predictive postulates from the functional approach to motivation and the reasonable person model in a service-learning context, it is possible to explore the relationship between intentions to engage in prosocial behaviors and motive fulfillment. This understanding can then be applied to structuring and implementing service-learning programs that are sensitive to the motives and personal goals held by students.

## METHOD

### Participants

Sixth, seventh, and eighth grade students (n = 2,365) and teachers (n = 37) in Maryland and Virginia participated in this study. Teachers were recruited through a combination of a mailing and phone calls to teachers trained in the use of CBF curricula or service-learning projects. Teachers were placed in treatment "conditions" based on the educational programs that they had independently (or because of district or school requirements) decided to use in their classrooms. Although teachers were not randomly assigned to conditions, student placement in different programs does not reflect a bias in which students individually chose conditions such as required or non-required service-learning. Middle school students generally do not have the option of selecting a school or classroom.

### CBF Education Programs

The students and teachers in this study participated in various combinations of CBF one-day field trips, curricular activities, and the *Bay Grasses in Classes (Grasses)* service-learning project. Some also participated in service-learning projects other than *Grasses*.

#### ***One-day field trips***

CBF one-day field trips take place in diverse locations around the Bay and provide students with the opportunity to learn first hand about ecology, history, and environmental issues related to the Chesapeake Bay.

#### ***Curricular programs and materials***

CBF's curricular materials are designed to help teachers integrate Bay-related activities into their classroom instruction. To receive the materials, teachers must participate in CBF professional development workshops. The curricular guides include a variety of learning activities as well as suggestions for Bay-related service-learning projects. Teachers are encouraged to, but may not implement a service project as part of a Chesapeake Bay learning unit.

#### ***Bay Grasses in Classes Program***

CBF developed the *Grasses* program in response to a combination of factors including the implementation of a state service-learning requirement in Maryland and feedback from teachers that they did not have sufficient materials or knowledge to introduce Chesapeake Bay service-learning projects into their classrooms without assistance. Teachers who participate in the program must attend a training workshop where they receive all materials and equipment needed to grow underwater grasses in the classroom. Components of *Grasses* include a simple aquaculture system that is set up by students, an interdisciplinary classroom curriculum, and a hands-on field experience that includes planting the grasses within the Chesapeake Bay watershed.

### ***Non-CBF Bay service-learning projects***

To provide additional opportunities for comparison, teachers and students who participated in a CBF curricular program and a service-learning project other than *Grasses* were also included in the study. Examples of Non-CBF service-learning projects that these teachers and students developed and completed included: individual student projects such as small scale habitat enhancement or Bay-related information campaigns, and class projects such as building and installing bluebird boxes, coordinating school recycling programs, planting trees, or growing and releasing yellow perch.

### ***No Service-learning students***

To provide a comparison group, this study also includes students and teachers who used CBF curricular activities, but who did not participate in any service-learning. Thirty-five percent of the 912 students in this no service-learning group also went on a CBF field trip (Table 4). This group of no service-learning students provided a baseline against which the *Grasses* service-learning students and the Non-CBF service-learning students could be compared.

## **Instruments**

Instruments for this study included student pretests and posttests. Measures of intentions to engage in ERBs were adapted from survey instruments that were used and found to be reliable in a previous study (Zint, Kramer, Northway, & Lim, 2002). The intentions to help the Bay index (Table 1) was an average of responses to six items (each measured on a 5-point scale). The reliability (alpha) of the index was .82.

### **Table 1. Index of Intentions to Help Bay**

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Posttest Alpha = .82, (1-5 Scale, Very unlikely to Very likely)

In the next six months I intend to . . .

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Protect the Bay by conserving water at home.

Tell others about ways that they can protect the Bay.

Plant trees to help the Bay.

Clean up or care for a local stream.

Join Student BaySavers.

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Measurement scales for motive fulfillment constructs were developed based on past research and preliminary qualitative and quantitative research. Based on relevant literature (e.g., Clary, et al., 1998b; Kaplan, 2000; Stukas, et al., 1999) a preliminary set of motives were identified. Through qualitative individual and group interviews with students (n = 60) attending a CBF student workday, motives expressed by young people helping the Bay were identified. A scale of motive measures was then developed and pilot tested with seventh grade students (n=92) in Michigan. Based on results from this pilot, a posttest scale with items addressing the fulfillment of the proposed motive constructs described in Table 2 was developed and implemented.

**Table 2: Motive Constructs for Index of Motive Fulfillment**

Motive	Description	Source(s)
Competence & Understanding	Reflects a desire to know what is going on and what to do.	Kaplan (2000); White (1959)
Social Affiliation	Reflects a desire to belong to a group, establish friendships, intimacy, or a sense of community. Social affiliation goals have been found to influence students' attitudes about school and achievement.	Maslow (1954); Wentzel (1991),
Participation	Individuals are motivated to play a role in what is going on around them. Learning about problems without being able to help solve them is unpleasant, and can even lead to a sense of helplessness. Participation is not just taking action, but taking action that is satisfying or meaningful in some way.	Kaplan (2000)
Autonomy	When decisions are made externally for students, the result can be a decrease of interest in and sense of personal relevance of what they are learning about. This does not suggest that students always desire to be completely self-directed, just that some level of choice and autonomy has been found to increase motivation.	Brehm & Brehm (1981); Deci & Ryan (1985)

Based on previous research, it was expected that factor analysis would reveal a cognitive structure in which measures of motives would separate into three factors representing understanding/competence, social affiliation, and autonomy.<sup>1</sup> However, an unforced Principle Axis Factor analysis including items proposed to measure these three facets of motivation yielded a one-factor solution. Therefore, the eight measures that were included in the Factor Analysis were averaged to form an index reflecting one motive fulfillment construct (Table 3). The reliability (alpha) of this index was .87.

**Table 3. Index of Motive Fulfillment**

Posttest Alpha = .87, (1-5 Scale, Strongly disagree to Strongly agree) While studying about the Chesapeake Bay (and working on a project to help it) . . .	Factor*
I developed new skills. (Und./Comp.)	.73
I learned how to help solve some of the problems that the Bay faces. (Und./Comp.)	.67
I discovered some things that I am good at doing. (Und./Comp.)	.67
I learned things that are important to my life. (Und./Comp.)	.67
I was able to do hands-on learning about the Bay, instead of just reading or hearing about it. (Und./Comp.)	.70
I had opportunities to work with my friends. (Soc. Aff.)	.67
I worked as part of a team to help the Bay. (Soc. Aff.)	.71
I was able to make my own choices about important aspects of the project. (Aut.)	.55

\*An unforced Principle-Axis Factor Analysis yielded a one-factor solution with these loadings

There was some evidence that the lack of separation of factors may have reflected the developmental stage of the study participants. Separate factor analyses conducted for sixth, seventh, and eighth grade students with pretest motive importance rating measures revealed that a two-factor motive importance structure was more distinct (i.e., had less double loading measures and less non-loading measures) for seventh graders as compared to sixth graders. In addition, the factor analysis model of motive importance ratings for eighth graders yielded a three-factor solution. This suggests that what older students consider to be separate motives, may not be well differentiated in the minds of younger adolescents. Further work in this area will likely lead either to additional evidence that young adolescents do not have a high degree of cognitive differentiation for the motives explored in the study, or to better validated items and indices for measuring the constructs.

## Procedure

Teachers administered pre and posttests to students before and after their CBF learning experiences. Groups for the analysis included the combinations of field trips and service-learning projects shown in Table 4. All students, even those who did not engage in service or go on a field trip, participated in CBF curricular learning activities in their classrooms. Thus, analyses test for any effect of service-learning or field trips in addition to that found for participating in classroom curricular activities about the Bay. The length of time between pre and posttests varied from one week to seventeen weeks. The mean time between pretests and posttests was nine weeks.

**Table 4. Number of Students in Six Service-learning and Field Trip Treatment Groups**

	CBF Field Trip		No CBF Field Trip	
	n	%	n	%
<i>Grasses</i>	405	17	518	22
<b>Non-CBF Bay Service Project</b>	194	8	336	14
<b>No Service-learning</b>	317	14	595	25

### Data Analysis

The SAS PROC MIXED data analysis technique was used in this study. PROC MIXED provides analysis options similar to ANOVA or regression with the added benefit of fitting hierarchical models (e.g., students nested within classrooms) (Singer, 1998). The random effect of classroom was included in all models in this study.

In the analysis, some of the limitations of quasi-experimental design were addressed by controlling for pre-existing covariates. The models control for gender and pretest levels of past behaviors and intentions to help the Bay. Covariates that were not significant predictors (and which were thus removed) included grade level, public/private school, race, and urban/suburban/rural community.

### Experimental Hypotheses

Through completing a quasi-experimental design pre and posttest study with middle school classrooms using CBF programs, the following primary research question was addressed. Does students' motive fulfillment mediate the effect of treatment (i.e., field trip and service-learning) on reported intentions to engage in ERBs? Based on the functional approach to motivation (Clary, et al., 1998b), it was hypothesized that motive fulfillment would play a mediating role in the effect of all of the treatment programs on students' intentions to help the Chesapeake Bay. In addition, some specific hypotheses about individual relations among the variables in the mediation model were also made.

Because of *a priori* knowledge about *Grasses*, it was predicted that this program would not have a positive influence on students' levels of motive fulfillment and their intentions to help the Bay. *Grasses* was developed in response to Maryland teachers' needs for a service-learning program that would be easy to implement with their classrooms. After service-learning was mandated as a graduation requirement for Maryland students in 1992 (Finney, 1997), CBF found that an increasing number of teachers expressed difficulty in integrating environmental service-learning into their lesson plans. Therefore, CBF developed *Grasses* with the goal of providing a service-

learning package that would be easy for teachers to implement. The potential downside of this pre-packaged form of service-learning is that in such programs, students may not have opportunities to be involved in planning service-learning projects. Thus, it was hypothesized that students in this program would not report high levels of autonomy motive fulfillment. Also, although *Grasses* is intended to take place both in the classroom and in the field, it was known that as many as half of the participating students generally did not go into the field to plant the grasses. This could limit students' motive fulfillment related to gaining competency skills.

Hypotheses about the effect of the Non-CBF service-learning programs on students' motive fulfillment and intentions were less certain. These programs were implemented individually by teachers, so the characteristics of these programs were not fully known to the researcher. However, based on general guidelines for effective service-learning programs that match many of the hypothesized motives in the study (Alliance for Service-learning in Education Reform, 1995; Toole, 1999), it was thought that positive effects on motive fulfillment and intentions would be found for the Non-CBF service-learning students.

The hypothesized effect of field trips on students' motive fulfillment and intentions was also uncertain. EE research has suggested that one time exposure to programs is generally not successful for changing students' behaviors (Hungerford & Volk, 1990). Because field trips are one-day programs, one would not expect a sizable change in students' intentions and behaviors. However, field trips may support many of students' motivational goals because students often find the outside learning environment to be exciting and engaging. CBF field trips, though short, provide opportunities for hands-on exploration of the Bay, finding out about Bay problems and solutions, and working together with other students. Based on positive affective responses found in previous studies of CBF field trip programs (Zint, et al., 2002), it was thought that field trips would positively influence motive fulfillment. However, because the experiences only lasted one day, they were not predicted to have a large positive effect on students' intentions to help the Bay.

## RESULTS<sup>2</sup>

In order to emphasize the mediating role that motive fulfillment plays in the relation between treatment and intentions to help the Bay, the results for the main effects of *Grasses* service-learning, Non-CBF service-learning, and field trips are presented.

### **Grasses**

Compared with the curriculum only treatment, *Grasses* had a negative effect on motive fulfillment (effect =  $-.2$ ,  $p < .01$ ) (Model 2). Motive fulfillment had a positive effect on intentions (effect =  $.29$ ,  $p < .001$ ) (Model 3). And *Grasses* changed from a nonsignificant negative to a nonsignificant positive predictor of intentions when motive fulfillment was controlled for (in Model 1, effect =  $-.02$ ,  $p = .63$ ; in Model 3, effect =  $.03$ ,  $p = .42$ ). Although *Grasses* was not significantly affecting intentions differently from curriculum activities only (no service condition), motive fulfillment was playing a mediating role in the model (Sobel test statistic =  $-3.25$ ,  $p < .01$ ) (Preacher & Leonardelli, 2001). The negative effect of *Grasses* on motive fulfillment probably reflects the fact that the *Grasses* program does not follow several important standards for quality service-learning.

### **Non-CBF service-learning**

Non-CBF (or teacher created) service-learning did not have a different effect on motive fulfillment than the no service-learning treatment (effect =  $.08$ ,  $p = .27$ ) (Model 2). Because this relation was not significant, motive fulfillment did not play a mediating role in the relation between Non-CBF service-learning and intentions to help the Bay (Sobel test statistic =  $1.14$ ,  $p = .25$ ) (Preacher & Leonardelli, 2001). The finding that Non-CBF service-learning did not predict motive fulfillment was probably caused by the lack of cohesiveness of this treatment. Teachers in this group created service-learning projects that reflected a range of quality in terms of following service-learning best practices. Therefore, a difference in motive fulfillment between these students and students who did not engage in service-learning was not demonstrated and motive fulfillment did not play a mediating role.

### **Field trips**

Compared with the curriculum only treatment, participation in a CBF field trip led to a positive effect on students' motive fulfillment (effect =  $.56$ ,  $p < .001$ ) (Model 2). Because field trips had a positive effect on motive fulfillment, and motive fulfillment had a positive effect on intentions to help the Bay, motive fulfillment was a significant mediator in this case (Sobel test statistic =  $8.86$ ,  $p = 0$ ) (Preacher & Leonardelli, 2001). Before controlling for motive fulfillment, the effect of field trips on intentions was positive (effect =  $.08$ ,  $p = .04$ ) (Model 1). Controlling for motive fulfillment, the effect of

field trips on intentions was negative (effect =  $-.09$ ,  $p = <.01$ ) (Model 3). Because the relation between field trips and motive fulfillment was strong, and the relation between motive fulfillment and intentions was strong, motive fulfillment had a powerful influence in this case, changing the effect of field trips on intentions from a significant positive relation to a significant negative relation.

**Model 1. Effects of Grasses, Non-CBF Service, and Field Trip on Intention and Intention Least Square Means**

	Effect	Std. Error	P-Value	Mean* (On 1-5 Scale)	Std. Error
Grasses Service	-.02	(.05)	.63	2.19	(.03)
Non-CBF Service	.11	(.06)	.06	2.33	(.05)
No Service	0	-	-	2.21	(.04)
CBF Field Trip	.08	(.04)	.04	2.28 <sup>a</sup>	(.03)
No Field Trip	0	-	-	2.21 <sup>a</sup>	(.03)

\*The pretest mean for the entire sample for intention to engage in ERB was 2.19 (.77). The posttest mean for the entire sample for intention was 2.22 (.78).

<sup>a</sup> Means are significantly different at  $p=.05$  level.

**Model 2. Effects of Grasses, Non-CBF Service, and Field Trip on Motive Fulfillment and Motive Fulfillment Least Square Means**

	Effect	Std. Error	P-Value	Mean* (On 1-5 Scale)	Std. Error
Grasses Service	-.20	(.06)	<.01	3.18 <sup>a,b</sup>	(.04)
Non-CBF Service	.08	(.07)	.27	3.46 <sup>a</sup>	(.06)
No Service	0	-	-	3.38 <sup>b</sup>	(.04)
CBF Field Trip	.56	(.05)	<.001	3.62 <sup>c</sup>	(.04)
No Field Trip	0	-	-	3.05 <sup>c</sup>	(.03)

\* The mean for the entire sample was 3.26 (.91).

<sup>a,b,c</sup> Means are significantly different at  $p=.05$  level.

**Model 3. Effects of Grasses, Non-CBF Service, and Field Trip on Intention with Motive Fulfillment as Predictor and Intention Least Square Means**

	Effect	Std. Error	P-Value	Mean* (On 1-5 Scale)	Std. Error
Motive Fulfillment	.29	(.02)	<.001	-	-
Grasses Service	.03	(.04)	.42	2.21	(.03)
Non-CBF Service	.09	(.05)	.07	2.27	(.04)
No Service	0	-	-	2.18	(.03)
CBF Field Trip	-.09	(.03)	<.01	2.17 <sup>a</sup>	(.03)
No Field Trip	0	-	-	2.27 <sup>a</sup>	(.02)

\*The pretest mean for the entire sample for intention to engage in ERB was 2.19 (.78). The posttest mean for the entire sample for intention was 2.22 (.78).

<sup>a</sup> Means are significantly different at  $p=.05$  level.

Summarizing these results, the two service-learning programs examined in this study did not have consistent effects on motive fulfillment or significant effects on intentions. Motive fulfillment, however, had a consistently strong relation with students' intentions to help the Bay. This suggests that although motive fulfillment is a promising mediator for understanding how and why educational programs may lead to civic outcomes, the broad category of *service-learning program* may not be specific enough to capture the essence of what is leading to motive fulfillment and intentions.

## DISCUSSION

If the overarching category of *service-learning program* is not sufficiently narrow to predict differences among students' intentions, it may be helpful instead to focus on specific service-learning design and implementation characteristics to examine how they relate to motive fulfillment and intentions. The most instructive case from this study may be the *Grasses* program. The characteristics of *Grasses* that relate to program design are relatively easy to consider in the context of motive fulfillment and intentions. Also, some additional data that were gathered about the program lend further explanatory evidence to understanding why this program had a negative effect on students' motive fulfillment relative to the no service-learning group.

One element of *Grasses* design that may have negatively impacted students' motive fulfillment and led to the lack of effect of the program on intentions is the fact that it is a pre-packaged program. Because the program is very specific and structured in its content, many participating students do not have opportunities to be involved in project planning in a meaningful way. Furthermore, the structured program does not provide sufficient opportunities for students to interact with and develop a collegial relationship with adults other than their teachers. Previous research has suggested that student decision-making and student-adult relationships are important aspects of educational programs like service-learning. An experiential education study by Conrad and Hedin (1981) demonstrated that experiences that fostered student autonomy promoted personal growth attributes such as self-esteem. Conrad and Hedin (1981) also found that experiences that fostered collegial relationships with adults led to social outcomes including increased sense of responsibility.

The pre-packaged content of the program may also negatively effect the extent to which students feel the program is relevant to their lives and providing them with knowledge and skills that will be useful in their lives. In work with young urban environmental activists, Habib (1996) found perceived relevance to their own lives and communities to be a major reason why urban youth became involved in environmental actions. When a service-learning project covers limited and specific content areas and offers limited and specific participatory roles, opportunities for students to choose topics that interest them, independently explore the problem space, and devise their own solutions for addressing the problem are not provided. The results of this study suggest that the very characteristics that make *Grasses* easy to implement, and thus desirable to many teachers, may be negatively related to the aspects of service-learning that are most promising for supporting the fulfillment of students' personal goals and motives.

There is also evidence that implementation of the program may have contributed to the lower level of motive fulfillment reported by many *Grasses* students. For example, 15 percent of students who were in classes participating in *Grasses* did not know that their class was engaged in this project. A further 26 percent reported that they were not involved in growing and testing the grasses that were in their classrooms. Furthermore, although planting grasses is intended to be a culminating experience in *Grasses*, few students actually participated in this aspect of the program. Only 44 percent of *Grasses*

students went on a Chesapeake Bay field trip while participating in the program, and of the students who did go on a field trip, only 44 percent reported that they actually planted grasses.

Although this evidence of reduced participation in *Grasses* reflects implementation problems, it also relates to program design. *Grasses* was designed to help teachers in a variety of schools, including those in public schools with multiple classrooms and many students. The packaged format of the program was intended to make it easier to use for many CBF teachers who are responsible for four or five classes and upwards of 150 students. Although it is relatively easy to implement and highly regarded by teachers, the *Grasses* program may simply not provide sufficient opportunities for meaningful student participation. This type of trade-off, where many students are nominally involved in a service-learning project but few students actively participate in meaningful service (e.g., by growing, monitoring, and planting grasses) is likely to lead to poor results. In a chapter concerning program quality, Eyler and Giles (1997) report that doing meaningful work and making a contribution during service-learning were important program elements for fostering outcomes including learning, personal growth, and social responsibility.

Whereas *Grasses* had a specific array of characteristics associated with it that allowed for an examination and some *post hoc* understanding of the mediation pattern that was found for this program, the Non-CBF service-learning treatment was not sufficiently specific to provide this type of information. Because the Non-CBF service-learning treatment reflected a range of service-learning design and implementation characteristics that were described in more and less detail by different teachers, it is not possible to gain a great deal of insight into the results that were found. At most, one may report that the spectrum of Bay-related service-learning programs implemented by these teachers did not influence students' levels of motive fulfillment or intentions to help the Bay differently from the programs implemented without a service-learning component.

Several observations about the current state of service-learning in Maryland and Virginia and recommendations for future service-learning research and practice may be drawn from these results. One observation is that this study reflects environmental service-learning as it is currently being implemented in schools in Maryland and Virginia. As is evidenced by this study, not all service-learning currently being implemented follows standards for quality service-learning (Alliance for Service-learning in Education Reform, 1995; Toole, 1999). Because these quality practices support students' personal goals and motivations that relate to their intentions to engage in civic behaviors, many service-learning programs that are currently in use may not be achieving the level of outcomes that are expected and desired of them.

The importance of quality service-learning program design and implementation calls into question the wisdom of creating service-learning mandates in schools where teachers may not have the training or support needed to implement effective service-learning. Teacher responses in this study suggest that many teachers face a variety of barriers to using effective service-learning with their classes. For instance, 66 percent of

the overall sample of teachers who participated in the study (N=54)<sup>3</sup> disagreed with the statement that they had adequate preparation time to conduct Chesapeake Bay service-learning projects with their classes. 64 percent disagreed with the statement that they had adequate monetary resources, and 49 percent disagreed with the statement that they had adequate transportation to implement Chesapeake Bay service-learning. Given these constraints, service-learning mandates such as the requirement in the state of Maryland (Finney, 1997) may lead to teachers implementing service-learning of compromised quality. And, unfortunately, this study suggests that when service-learning is not implemented in a manner that models best practices, it may actually have negative impacts on students' motivations and no impact on their civic outcomes.

With regard to service-learning research, the findings reported in this study, point to several promising paths. First, because motive fulfillment was related to the intentions outcome while service-learning programs were not, it will be instructive in the future to focus on specific service-learning program and design characteristics to examine how they relate to motive fulfillment and outcomes such as students' civic behavior intentions. The importance of understanding the relation between program inputs and outcomes has also been emphasized in related service-learning studies including Melchior and Bailis's (2002) recent chapter examining the impact of service-learning on civic outcomes, and Allen, et al.'s (1994) article examining the effectiveness of autonomy and relatedness supporting program characteristics for preventing problem behaviors in adolescents.

A decade ago, service-learning researchers struggled to demonstrate that service-learning can have positive impacts on student outcomes (Howard, Gelmon, & Giles, 2000). This research was intended to encourage districts, schools, and teachers to integrate service-learning into their curricula. Now that this goal has been achieved, and service-learning has been integrated into many schools across the United States (Chapman, 1999), it is important to provide evidence concerning the program design and implementation characteristics that will be most effective in achieving various desired outcomes. Without such evidence, it may be difficult to convince schools and teachers that the program characteristics that can be difficult or intimidating to implement at the outset are also likely to be key to the success of a program.

Finally, one suggestion concerning the way in which various program design and implementation characteristics are examined may be instructive. Although relevant results are not presented here, another pertinent finding of this study was that students' perceptions of service-learning program characteristics (e.g., their reports of whether they had choice about their projects or opportunities to reflect) were strongly related to their intentions. In contrast, teachers' reports of whether or not they used reflection activities with students and whether or not they provided students with choices about their service-learning projects were not related to students' intentions.

This suggests that student ratings of program characteristics may not always match the program facilitators' beliefs about program characteristics. Thus, student reports alone may not be adequate indicators of program characteristics. This is a concern that was also raised by Allen, et al. (1994, p. 636). They state that, "[i]t is

possible that measures of autonomy and relatedness at a site reflect students' status rather than influence it . . . Obtaining measures from multiple informants and including items sensitive to both student and facilitator behavior lessens this possibility but does not eliminate it." Another effective way to address this issue would be to conduct experimental or quasi-experimental design studies that specifically compare the effectiveness of various program characteristics. Interactions among program characteristics may also be examined through experimental design studies. These types of intensive studies will be necessary to separate program design inputs from students' perceptions of programs. Independent measures of these constructs will lead to a deeper understanding of the mechanisms through which service-learning program characteristics influence desired outcomes.

The study presented here describes preliminary findings demonstrating how motivation theory may be applied to EE and service-learning research, program design, and implementation. Although results concerning the effect of treatment on intentions were not strong, evidence was presented to support that motive fulfillment is strongly related to students' intentions to engage in ERBs. Through continuing research directed toward refining motivation measures, understanding developmental differences in adolescent motivation, and exploring the relation between program design and motive fulfillment, we may gain a better understanding of how to increase both positive psychological functioning in students and positive actions on behalf of our environment and society.

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<sup>1</sup>Participation measures were not used for analyses because they were only included in instruments completed by service-learning students. Although not reported in this study, analyses that focused specifically on service-learning students suggest that participation is also a motivational goal with important implications for fostering commitments to ERBs.

<sup>2</sup> A few notes on the analyses and results are provided here. The SAS PROC MIXED output provides effects relative to no treatment condition. Reported effects are analogous to unstandardized beta weights in regression. Field trip by service-learning interactions were tested and found not significant for the first and third models. There was a relatively small, but significant interaction in the model examining the effect of treatment on motive fulfillment. In order to simplify interpretation, and because the interaction effect did not alter the relations among the groups (i.e., field trip students had significantly higher levels of motive fulfillment than non-field trip students for all three service-learning conditions), the additive model was reported. When appropriate, a Bonferroni Adjustment was used in the comparison of multiple least square means.

<sup>3</sup> The N=54 reported reflects that although they were not included in the analyses reported here, this study also included a group of teachers and students who only participated in CBF field trips and a group who did not participate in any CBF programs.