

**Middle School Students' Attitudes toward
Required Chesapeake Bay Service-Learning**

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ABSTRACT

The issue of mandated service-learning has been a hotly debated topic in the past several years. By drawing on data collected during an evaluation of the Chesapeake Bay Foundation's (CBF's) environmental education programs, this study provides some insight into positive and negative aspects of mandatory service-learning. The following research questions are addressed: (1) How do students' demographic characteristics relate to their attitudes toward required service-learning (ARSL)? (2) How do educational programs including mandated and non-mandated service-learning affect students' ARSL? (3) How do required service-learning and ARSL relate to outcomes including behavioral intentions, personal responsibility, and environmental sensitivity (i.e., caring)? Results suggest that the demographic factors of gender and racial/ethnic affiliation are related to students' ARSL. Furthermore, students who participated in a service-learning program that did not provide many opportunities for autonomy had more negative ARSL than other students. ARSL influenced student outcomes including behavioral intentions, personal responsibility, and environmental sensitivity. However, actual service mandates did not influence students' ARSL or student outcomes. Overall, students' attitudes about service-learning requirements were more important than whether or not an actual service mandate existed. Based on these findings, several suggestions for educational policy-makers, administrators, and teachers with an interest in service-learning are made.

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EXECUTIVE SUMMARY

Problem / Research Question

There are several perspectives to consider when addressing the question of whether or not to mandate service-learning. Proponents of requirements believe that mandated service-learning will help foster civic engagement among students (including those who would not be likely to become involved without a mandate). Opponents cite evidence that external pressures of requirements may alienate students from future service. Although the question of whether to require service-learning has important implications for policy and program development decisions, few studies have evaluated the influence that service-learning mandates have on students.

By drawing on data collected during an evaluation of the Chesapeake Bay Foundation's (CBF's) environmental education programs, this study addresses the following questions:

- (1) How do students' demographic characteristics relate to their attitudes toward required service (ARSL)?
- (2) How do educational programs including mandated and non-mandated service-learning affect students' ARSL?
- (3) How do required service-learning and ARSL relate to outcomes including behavioral intentions, personal responsibility, and environmental sensitivity?

Investigation of these questions provides insight into whether service-learning requirements achieve their desired outcomes and how potential negative impacts may be reduced through careful program design and implementation.

Theory and Prior Research

Deci and Ryan's (1985) cognitive evaluation theory suggests that when individuals perceive that they are being externally controlled, they tend to lose their intrinsic motivation to engage in the promoted behaviors. This theory is pertinent to service-learning requirements because requirements may serve as external controls. However, most things in school are required and even required service-learning can provide opportunities for self-determination. Thus, it is uncertain to what extent mandated service-learning is "perceived" as externally controlling, and consequently, apt to negatively impact students' continuing prosocial or proenvironmental behaviors.

Several studies provide insight into this issue. In a study concerning mandatory volunteerism, Stukas, et al. (1999) found that college students who indicated they would not freely volunteer were more negatively affected by mandates than those who said they would freely volunteer. This suggests that mandating service to encourage those not

likely to choose service may not be a successful strategy. In a study concerning gender differences in adolescents' attitudes toward mandatory community service, Miller (1994) found that females were more positive toward proposed service requirements than males. As with Stukas, et al.'s (1999) study, this finding suggests that service mandates may not affect all students similarly. Although these findings are relevant to the issue of whether or not to mandate service-learning, both Miller's (1994) and Stukas, et al.'s (1999) studies were conducted in a community service rather than a service-learning context. Because of fundamental differences between community service and service-learning (e.g., the fact that service-learning is integrated into an academic curriculum) (Furco, 2002) it is important to examine these questions in the specific context of service-learning.

Methods

Sixth, seventh, and eighth grade students (N = 2,066) and teachers (N = 37) participated in this quasi-experimental pre/posttest design study. All students participated in classroom activities about the Chesapeake Bay. Sixty-three percent of the students engaged in Bay service-learning projects (either the CBF program *Grasses in Classes* or a project developed by the individual teacher). Fifty-nine percent of service-learning students engaged in service-learning to fulfill a requirement.

The SAS PROC MIXED technique was used to examine the research questions while accounting for the random effect of students being nested in classrooms. Scales for ARSL, intentions to help the Bay, personal responsibility, and environmental sensitivity all yielded adequate levels of reliability and validity.

Results

(1) How do students' demographic characteristics relate to their attitudes toward required service?

Gender had a significant effect on students' ARSL, with female students reporting more positive attitudes. Racial/ethnic affiliation had a significant effect, with Caucasian students reporting more positive ARSL than African American students. The state in which students lived was tested to examine any effect of the Maryland service-learning requirement. There was no difference in ARSL between Maryland and Virginia students. In addition, there was no effect of grade level, or students attending public versus private schools on ARSL.

(2) How do educational programs including mandated and non-mandated service-learning affect students' ARSL?

Students participating in the *Grasses* program had more negative ARSL than students whose teachers had developed their service projects or students who did not participate in service-learning. There was no difference between the latter two groups.

This result likely reflects the fact that the *Grasses* program does not follow several best practices of service-learning such as providing opportunities to be involved in planning projects. For example, students in *Grasses* felt that they had fewer opportunities to make decisions about their projects than students whose teachers developed their service-learning projects.

None of the program characteristics reported by the teachers had an effect on students' ARSL. Tested characteristics included having a service-learning requirement, using CBF programs to fulfill a requirement, providing students with opportunities for reflection, and providing students with choices about their service-learning.

Although teacher-reported program characteristics did not influence ARSL, students' perceptions of program characteristics had a strong influence on their attitudes. Students who felt that their teachers provided them with opportunities to make their own choices, to think about, and to talk about how they helped the Bay reported more positive ARSL.

(3) How do required service-learning and ARSL relate to student outcomes including behavioral intentions, personal responsibility, and caring about the environment?

Using service-learning to fulfill a requirement did not have an effect on students' behavioral intentions, personal responsibility, or environmental sensitivity (caring) for the Bay. However, a strong positive relation was found between students' posttest ARSL and their intentions, personal responsibility, and environmental sensitivity.

Conclusions

This study substantially supported cognitive evaluation theory, which suggests that high perceptions of external control decrease individuals' intrinsic motivation. Service-learning requirements did not negatively impact student outcomes such as behavioral intentions per se. However, students' ARSL did. ARSL can be thought of as a surrogate for perception of external control. It is reasonable to expect that students who report that requiring service is a good idea and that they would serve even if they didn't have to, will be more likely to attribute their participation to their own positive beliefs about service, rather than to the external control of a requirement.

Because students' ARSL and perceptions of choice rather than teacher reported levels of requirements and choice were related to outcomes, one might conclude that students bring with them propensities to feel more or less controlled and that what happens in the classroom does not matter. However, this conclusion is challenged by the fact that students who participated in one particular program (i.e., *Grasses*) reported more negative ARSL and felt that they had fewer opportunities to make decisions about their service than students whose teachers had developed their projects. Thus, this study demonstrated both that different service-learning programs can lead to different perceptions of external control, and that these perceptions of external control are strongly

related to student outcomes such as behavioral intentions, personal responsibility, and environmental sensitivity.

Recommendations for Practice

The following recommendations describe some ways in which autonomy supporting program characteristics may be integrated into service-learning programs to enhance their effectiveness and reduce students' perceptions of being externally controlled.

- ◆ *Provide opportunities for autonomy and self-direction within all service-learning experiences.*
- ◆ *Provide opportunities for guided reflection to help students strengthen their self-identification as an intrinsically motivated helping person.*
- ◆ *If service-learning mandates are implemented, teachers should focus on service, learning, and reflection rather than on the requirement.*
- ◆ *Be sensitive to the potential that mandates may differentially affect various groups of students and individuals (e.g., male students may respond more negatively than female students).*
- ◆ *Develop and implement teacher professional development programs to ensure that teachers have the skills, resources, and support necessary to implement effective, autonomy-supportive service-learning experiences with their students.* Service-learning represents a new approach to instruction for most teachers, and many teachers may be apprehensive about turning over "control" to their students. Thus, professional development directed toward helping teachers integrate service-learning best practices (including autonomy supportive practices) will be especially important when service-learning requirements are created.

Recommendations for Future Research

Some questions that merit further exploration include the following.

- *Is mandated service-learning more appropriate for certain age groups?* This question is important because there may be some developmental levels that are more or less appropriate for implementing mandated service-learning programs.
- *How does the amount of student choice in mandated service-learning programs influence ARSL?* Although autonomy and choice have been shown to be important, it is possible that there is such a thing as too much autonomy, and that students who are given too many choices may have trouble focusing on one problem or solution.

- ***Can a lack of autonomy in service-learning experiences impact students' problem-solving ability as well as their attitudes and behaviors?*** Previous research concerning controlling teaching strategies has raised this issue in a general education context. Because fostering problem-solving ability is an important service-learning goal, further exploration of this topic in the context of service-learning is warranted.
- ***How do service-learning mandates affect the instructional practices of teachers?*** It is possible that service-learning mandates can help teachers transition to instructional approaches that match many of the goals of education reform. Alternatively, service-learning requirements may influence teachers to use service-learning projects that are easy to implement but that do not follow service-learning best practices. Thus, this question reflects a unique facet of the mandate debate with important consequences for the quality of service-learning that students will experience.

INTRODUCTION

There are multiple viewpoints and issues to consider when addressing the topic of whether or not to mandate service-learning. By drawing upon data collected during an evaluation of the Chesapeake Bay Foundation's (CBF's) middle school level environmental education program, this study addresses several specific questions concerning required service-learning. These include: (1) How do students' demographic characteristics relate to their attitude toward required service-learning (ARSL)? (2) How do educational programs including mandated and non-mandated service-learning affect students' ARSL? (3) How do required service-learning and ARSL relate to students' intentions to engage in desired behaviors after their educational experience is over?

As policymakers, administrators, and teachers consider whether or not to implement a service-learning or community service requirement for students, it is important to understand the effect that these requirements have on students' attitudes and behavioral intentions. This is especially true in the context of environmental service-learning, which overlaps with the field of environmental education. The primary mission of environmental education is to develop a citizenry that is able and willing to solve environmental problems (Tbilisi Intergovernmental Conference on Environmental Education, 1978). Thus students' attitudes, motivations, and behavioral intentions often take center stage as environmental education outcomes of interest.

Service-learning requirements can be appealing to environmental educators because they provide opportunities to engage large numbers of students in action projects that address environmental problems. However, while required service-learning will likely lead to an increase in the number of students participating in environmental service as a part of schooling, it is less clear that requirements will also lead to students who possess a continuing commitment to environmental service and citizenry.

Arguments for and against mandated service-learning abound. Proponents of mandated service-learning believe that mandated service will help foster civic engagement among students (Andersen & Murphy, 1999). Furthermore, they have proposed that, "all students benefit from the lessons learned through service, and mandating service is the only way to reach those who would never participate voluntarily" (Andersen & Murphy, 1999, p. 4). Alternatively, opponents of mandatory service-learning cite evidence that creating external pressures or requirements for service behaviors might alienate some students from future service (e.g., Deci & Ryan, 1985; Sobus, 1995; Stukas, Snyder, & Clary, 1999).

Using CBF programs as a context, this study presents the results of a quasi-experimental pretest/posttest design study addressing middle school students' ARSL. CBF is a regional 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 CBF supported environmental service-learning programs, CBF staff-run field trips, and environmental studies curricular

materials with teacher training. Through questionnaires administered to students participating in CBF educational programs (including service-learning and no service-learning, and required service-learning and non-required service-learning), this study examines how required and non-required service-learning relate to students' ARSL, behavioral intentions, sense of personal responsibility, and environmental sensitivity (i.e., caring) for the Chesapeake Bay.

There are several practical reasons underlying the decision to study Maryland and Virginia middle school students' ARSL. First, this study provides an opportunity to address a question that many educators and educational policy-makers are asking about, but that has not been thoroughly examined in a real world service-learning context. Very few studies have specifically addressed the effects of required service-learning on students' attitudes and intentions (e.g., Billig, 2000; Eyster, Giles, Gray, & Stenson, 2001).

Second, questions regarding required service-learning are of particular interest to educators in Maryland, where service-learning has been a graduation requirement for all public school students since 1993 (Finney, 1997). By directly comparing groups of similar students from Maryland and Virginia who are and are not required to complete service-learning hours to graduate, it is possible to begin to understand the effects that Maryland's mandate is having on public school students in this state.

REVIEW OF LITERATURE

Little research specifically addresses the effects of mandatory versus voluntary service-learning on continuing service behaviors (e.g., Billig, 2000; Eyer, Giles, Gray, & Stenson, 2001). Similarly, little research has been conducted on the topic of environmental service-learning (e.g., Lieberman & Hoody, 1998; Ramsey, Hungerford, & Tomera, 1981). However, a great deal of work has been done on closely related topics that speak to the question of mandating service-learning.

By considering the arguments for and against mandated service-learning, it is possible to highlight some of the theory underlying this pertinent research and to make some predictions concerning the effects of mandating service-learning. However, due to the unique qualities of service-learning pedagogy, findings related to other examples of external control may not hold for service-learning. Thus, in addition to some of the arguments for and against, consideration of the arguments in the specific context of service-learning is also presented.

The Case Against Required Service-learning

Some arguments against service-learning requirements are made based on a philosophical perspective. Although this study focuses on theories that can be empirically tested, it is important to realize that policy is not necessarily made on empirical grounds, and that values also play a role. Two examples of values based arguments against required service-learning include the idea that mandated service-learning is "involuntary servitude" that violates the 13th Amendment (Andersen & Murphy, 1999) and that it is oxymoronic to teach the meaning of civic engagement in a democratic society by mandating service (Stanton, et al., 1999).

The most predominant theoretical argument against required service-learning derives from Deci and Ryan's (1985) cognitive evaluation theory. In particular, the first proposition of cognitive evaluation theory relates to the importance of self-determination in fostering behavioral motivation. It states that,

“[e]xternal events relevant to the initiation or regulation of behavior will affect a person’s intrinsic motivation to the extent that they influence the perceived locus of causality for that behavior. Events that promote a more external perceived locus of causality will undermine intrinsic motivation, whereas those that promote a more internal perceived locus of causality will enhance intrinsic motivation” (Deci & Ryan, 1985, p. 62).

In the context of mandated service-learning, cognitive evaluation theory posits that because students are required to engage in service, they will attribute their motivation for serving to the requirement, rather than to an intrinsic desire to serve or a personal sense of their own altruistic nature. Thus, when the requirement to serve is removed, students will not have integrated a commitment to service into their self-perceptions of

the kind of people they are. In other words, students who are required to serve, will be less likely to view themselves as individuals who would choose to serve of their own volition.

Although no research has tested this theory as it relates to service-learning, a number of studies have supported cognitive evaluation theory in the context of continuing motivations to engage in volunteer activities and a variety of other tasks. In addition, some research has outlined conditions under which external controls such as sanctions or rewards will not undermine intrinsic motivation. In order to provide a better sense of how the undermining effects of external controls operate, some pertinent studies are described here.

The Effect of Rewards on Sustained Interest

In a 1973 study, Lepper, Greene, and Nisbett demonstrated that preschool children's intrinsic motivation to draw could be undermined by extrinsic rewards. The preschool participants were initially divided into expected reward and no reward groups. Children in the expected award group were told ahead of time that they would receive an award for drawing a picture. All students were then given an opportunity to draw. Later, children were provided with free play time. Children in the expected reward condition spent less time drawing than students who did not receive an award.

In a 1998 study, Cialdini, Eisenberg, Green, Rhoads, & Bator provided additional support for the undermining effect of rewards on intrinsic motivation. However, in their study examining elementary school students' motivation to practice handwriting, they found that the undermining effect of rewards could be avoided by attributing the desired action to an internal cause. Extrinsic rewards were initially provided to all students in the study. However, by verbally telling one group of students that they looked like children who understood the importance of good handwriting, Cialdini, et al. (1998) were able to influence this group of students to use better handwriting than other students during a subsequent free play period with no extrinsic rewards provided.

In the context of service-learning, these two studies provide several insights. First, they support the theory that external controls on behavior can undermine intrinsic motivations. However, the study by Cialdini, et al. (1998) suggests one way that negative impacts of external controls can be ameliorated. Children who were verbally labeled as having an internal trait relating to a behavior were not negatively impacted by the external control of rewards. Thus, it is possible that students participating in mandated service-learning may not be negatively affected by the requirements if their service behaviors are attributed to an internal cause. Guided reflection activities may help students to make this type of internal attribution.

The Effect of Rewards on Perceived Altruism

In the two studies described above, the outcomes that were examined (i.e., drawing and handwriting) did not have a moral component. Other research has expanded

the study of external rewards to consider how they influence intrinsic motivation to help, or altruism. Batson, Coke, Jasnosi, and Hanson (1978) conducted a study in which one group of undergraduate students was payed prior to helping an experimenter code data while another group was not payed. Batson, et al. (1978) found that the students who were payed for their help rated themselves as less altruistic than confederate students who did not help.

When applied to the context of service-learning, this study provides a cautionary warning for mandated service-learning. Whereas a major goal of service is to foster a commitment to helping and civic responsibility among students (Waterman, 1997), this study suggests that externally controlled service-learning could undermine students' perceptions of themselves as the kind of people who help others.

The Effect of Controlling Teaching Strategies on Analytic Problem-Solving Skills

Whereas the three studies described above suggest that external controls can influence motivations, behaviors, and self-perceptions, evidence also exists that external controls can influence outcomes such as performance. In a 1993 study, Boggiano, Flink, Shields, Seelbach, and Barrett found that when college students were taught about analytic problem-solving with controlling strategies, they performed worse on problems than students who were taught with non-controlling strategies. Students in the non-controlling condition were given more choice about how to solve the problems than students in the controlling condition were. Non-controlled students were also able to practice on their own; whereas controlled treatment students had to practice with the instructor.

This study suggests that non-controlling teaching strategies may not only enhance students' intrinsic motivation to engage in desired behaviors, but may also enhance students' abilities to solve problems. This is an intriguing result for those interested in service-learning, which focuses on creating effective real world problem-solvers. Although it has been argued that mandated service-learning will undermine intrinsic motivation to engage in continuing service after the requirement is completed, few have argued that mandated service will actually lead to less competent problem-solvers. The outcome of problem-solving ability is not addressed in the study presented here. However, this may be a very important topic for service-learning researchers to consider in the future.

The Effect of Service Mandates on Volunteerism and Attitudes toward Required Service

In a study concerning mandatory volunteerism, Stukas, Snyder, & Clary (1999) found that college students who indicated they would not freely volunteer were more negatively affected by mandates than those who said they would freely volunteer. Thus, mandating service to encourage those not likely to choose service may not be a successful strategy. In a study concerning gender differences in adolescents' attitudes toward

mandatory community service, Miller (1994) found that females were more positive toward proposed service requirements than males. As with Stukas et al.'s (1999) study, this finding suggests that service mandates may not affect all students similarly. Thus, in the context of mandated service-learning, it will be important to consider how mandates may positively or negatively affect different populations of students.

Why Mandated Service-learning May Not be Subject to Negative Effects of External Control

One problem with applying cognitive evaluation theory to the context of required service-learning is that externally controlled regulation of behavior in the service-learning context is not clear cut. The "perception of external control" may not be salient to service-learning students. A combination of factors can combine to weaken the saliency of a service-learning mandate. For instance, students may be habitualized to a variety of requirements in school, and thus will not feel controlled by something they perceive as an assignment like any other school assignment. Also, by providing opportunities for self-determination and independent decision making within a service-learning experience, teachers may be able to further reduce any perception of external control felt by their students (Stukas, et al., 1999). If the perception of external control is removed, regardless of the actual existence of a service requirement, the undermining effects of service mandates may not materialize.

A consideration of best practices for service-learning provides additional reasons why required service-learning may not lead to decreased motivation. According to The Alliance for Service-learning in Education Reform (1995), best practices for service-learning suggest that (1) service-learning is integrated with developmentally appropriate learning goals and involves schools and teachers in planning, (2) service-learning includes a reflective process of, for example, discussions and journal writing about service experiences, and (3) youth are involved in planning service-learning experiences.

It is possible that research demonstrating negative effects for related programs such as mandated community service (e.g., Stukas, et al., 1999) will not apply to required service-learning programs because service-learning, if implemented in line with best practice, should provide a significantly different experience from required community service (Furco, 2002; Pritchard, 2002). Students engaged in service-learning may have more opportunities to integrate their service into their self-perceptions (e.g., through teacher involvement and support, structured opportunities to reflect on the personal meaning of their service, and learning about scientific, political, and social issues pertinent to their service in the classroom). The result of this increased integration is that students may perceive themselves as intrinsically service-oriented individuals. Because of these differences between community service and service-learning, it is important to examine questions about mandated service-learning in the specific context of service-learning research.

The Case For Required Service-learning

Arguments in favor of required service-learning can be distilled into three main points. First, service-learning is beneficial for students, schools, and communities. Second, without a requirement, many students will not voluntarily participate in service-learning and will not benefit from its positive effects. And third, schools require many courses and experiences for students, so a service-learning requirement is a reasonable and appropriate educational policy (Andersen & Murphy, 1999).

In their issue paper on the topic of mandatory community service, Andersen & Murphy (1999) present several arguments for integrating service-learning into schools. These include that service-learning leads to positive outcomes such as civic engagement, increased engagement in school and academic achievement, an ethic of service, a sense of belonging, acceptance of diversity, competence and self-esteem, and protection against risky behavior. Furthermore, they propose that service-learning positively engages the community in the education of its youth

Potential Problems with the Argument in Favor of Mandated Service-learning

Positions in favor of mandated service-learning often stem from an interest in positive outcomes for students and communities. Educators want everyone to benefit from good educational practices. Thus, it seems to follow that requiring service-learning will help ensure that all students (even those who might not volunteer if given a choice) can experience the benefits of service-learning. However, there are some cautionary findings to consider before accepting this rationale.

For example, some of the research supporting the positive effects of service-learning may contain a bias pertinent to the issue of service-learning requirements. Because many studies did not randomly assign participants to service-learning and control group conditions, results demonstrating positive effects for service-learning may reflect pre-existing differences between students who chose to participate in service-learning compared with students who did not (Johnson, et al., 1998; Waterman, 1997).

Furthermore, there is evidence suggesting that the number of people who would not volunteer if asked is very small. An Independent Sector (1996) national survey found that respondents were four times more likely to volunteer if they were asked than if they were not asked. In addition, respondents who were African American, Hispanic, or between the ages of 18 and 24 were less likely to be asked to volunteer. However, when asked, respondents in these groups were as likely, if not more likely to volunteer than the national average. When considered on a national scale, these results provide a very positive picture for the future of American service. In 1995, only 43% of all survey respondents had been asked to volunteer, and 85% of this group did volunteer. Of the respondents who had not been asked, only 21% actually volunteered. Thus, the key to fostering service among a vast majority of students may be as simple as asking them to participate.

While the number of those who would not volunteer if asked is small, this group may be particularly vulnerable to potential negative effects of mandated service. The fact that college students who indicated they would not freely volunteer were more negatively affected by mandates (Stukas, et al., 1999) is one example of this. This suggests that mandating service to encourage the small subgroup of students who would not engage in service even if asked to do so may backfire and yield students who are even less likely to volunteer than before their mandatory service-learning experience.

Another example of service-learning mandates having potentially differential effects on separate groups of students relates to gender. In a 1996 national household education survey, Nolin, Chaney, Chapman, and Chandler (1997) found that females were more likely to volunteer than males. Research has also demonstrated that males have more negative attitudes toward or are more likely to feel controlled by mandated service than females (Stukas, et al., 1999; Miller, 1994). This suggests that service-learning mandates may have the unintended consequence of further alienating males from volunteer service and creating a situation where community service is an increasingly female pursuit.

Overall, it is evident that the issue of whether or not to mandate service-learning is very complex. It would not be possible for one study to definitively answer the question of whether or not mandated service-learning is an effective policy for fostering the civic outcomes that educators work to instill in their students. Therefore, the intention of the research reported here is to add to our understanding of the effects of mandated service-learning by examining a real world example of required and non-required service-learning. Insights provided through this examination can help future educators and policy makers consider some of the empirical pros and cons of mandating service at the middle school level. This information can then be used to help craft policies that are appropriate for the classrooms, schools, and districts under consideration.

METHODS

Participants

Sixth, seventh, and eighth grade students ($n = 2,066$) 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 and/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 curricular activities, one-day field trips, and the *Bay Grasses in Classes (Grasses)* service-learning project. Some also participated in service-learning projects other than *Grasses*.

Curricular Programs and Materials

CBF's curricular materials are designed to help teachers integrate Bay-related activities into their classroom instruction. In order to receive the materials, teachers must participate in a CBF professional development workshop. 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 Project

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. The non-CBF Bay service-learning projects represent a spectrum with projects that ranged from very little to a good deal of student choice and participation in planning and decision making. Examples of Non-CBF service-learning projects that these teachers and students 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.

One-Day Field Trips

Although CBF field trip programs do not directly relate to hypotheses concerning students' ARSL, a field trip versus no field trip factor is included in these analyses because results demonstrated that going on a CBF field trip directly affected students' ARSL. This finding probably represents a positive affect towards field trips that influenced students' overall responses to attitude items in the questionnaires. Because this study represents a real world experiment, it is important to include additional factors such as field trips that may be influencing attitude and intentions results. 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.

Instruments

Instruments for this study included student and teacher pretests and posttests.

Measures of ARSL, Intentions, Personal Responsibility, and Environmental Sensitivity

Measures of students' intentions to help the Chesapeake Bay, their personal responsibility to help the Bay, and their environmental sensitivity (i.e., caring) for the Bay were adapted from survey instruments that were used and found to be reliable in a previous study (Zint, Kramer, Northway, & Lim, 2002). A ARSL index was created for this study. The index score for each of the four constructs was calculated by averaging students' responses to the items specific to each construct. All items were measured on 5-point scales.

The three-item scale measuring ARSL reflects several different facets of students' evaluative judgements about required service in schools. The first item concerns students' general attitude toward requiring service as a part of school. The second item concerns attitudes toward having students work on Chesapeake Bay service projects in school. The third item assesses students' sense of being externally controlled to engage in projects to help the Bay by asking them if they would want to participate in such projects if they weren't required for school. The latter item was adapted from Stukas, et al. (1999). Combined, these three items provide an indication of how the students participating in this study feel about school requirements to engage in service.

Assessment of Reliability and Validity for Construct Indices

The reliability and validity of the four major constructs included in this study (ARSL, intentions to help the Bay, personal responsibility for the Bay, and environmental sensitivity for the Bay) were assessed through Cronbach alpha tests of reliability and an unforced Principle Axis Factor Analysis test for validity. The alpha tests demonstrated acceptable reliabilities for each index. The factor analysis yielded a four-factor solution in which all factor loadings greater than .4 were associated with their proposed constructs (Table 1).

Table 1: Four Factor Alpha Reliabilities and Pattern Matrix (Unforced Principle Axis Factor Analysis, Varimax Rotation)

Construct scales and items	Factor			
	1	2	3	4
<i>ARSL (Posttest Alpha = .76)</i>				
<i>(5-point response scale; 1 = Strongly disagree to 5 = Strongly agree)</i>				
It's a good idea to require kids to do service projects in school.	.55			
It's a good idea to have kids work on school projects that protect the Bay.	.82			
Even if I didn't have to for school, I would still want to work on a project to help the Bay.	.42			
<i>Intention to help Bay (Posttest Alpha = .82)</i>				
<i>(5-point response scale; 1 = Very unlikely to 5 = Definitely)</i>				
<i>In the next six months I intend to . . .</i>				
protect the Bay by conserving water at home.		.42		
tell others about ways that they can protect the Bay.		.61		
plant trees to help the Bay.		.59		
clean up or care for a local stream.		.52		
join Student BaySavers.		.64		
participate in a Student BaySavers workday.		.72		
<i>Personal Responsibility (Posttest Alpha = .90)</i>				
<i>(5-point response scale; 1 = Strongly disagree to 5 = Strongly agree)</i>				
<i>It is my personal responsibility to . . .</i>				
help protect the Chesapeake Bay.			.78	
help protect aquatic animals such as fish, oysters, and crabs.			.83	
help protect natural areas such as streams, rivers, wetlands, and marshes.			.80	
<i>Environmental Sensitivity (Posttest Alpha = .84)</i>				
<i>(5-point response scale; 1 = Not at all to 5 = Very, very much)</i>				
<i>How much do you care about . . .</i>				
the Chesapeake Bay.				.73
aquatic animals such as fish, oysters, and crabs.				.69
natural areas such as streams, rivers, wetlands, and marshes.				.72

Note. Factor loadings greater than .4 are shown.

Measures of Service-learning Program Characteristics

In addition to the construct measures described earlier, information about service-learning program characteristics was also collected from both teachers and students. Program characteristics described by teachers included yes or no reports of whether or not:

- Service-learning was required of students for graduation
- CBF materials/programs were used to fulfill the service-learning requirement
- Individual students' service-learning hours were recorded
- Reflection activities and assignments were used with students
- Students were provided with choices about Chesapeake Bay projects and lessons

Program characteristics were also described from the students' point of view. Students answered questions using 5-point response scales ranging from 1 = strongly disagree to 5 = strongly agree that their service-learning experience afforded them the following opportunities:

- To make their own choices about their service-learning project
- To talk or write about they helped the Bay
- To think about how they helped the Bay

Using a median split, students were divided into high and low groups for each of these student-rated program characteristics.

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 2. 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. The length of time between pre and posttests varied from one week to seventeen weeks. The mean time between pre and posttests was nine weeks.

Table 2. Number of Students in Six Service-learning and Field Trip Treatment Groups

	CBF Field Trip		No CBF Field Trip	
	n	%	n	%
<i>Grasses</i>	367	18	462	22
Non-CBF Bay Service Project	174	8	289	14
No Service-learning	265	13	509	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 techniques 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. The models control for gender, race, field trip condition, and pretest levels of past behavior and dependent variables. Covariates that were not significant predictors (and which were thus removed from non-demographic factor models) included grade level, state, and public/private school.

Research Questions and Hypotheses

This study addresses the following research questions pertinent to the issue of whether or not mandated service-learning will be an effective policy for yielding environmental education and service-learning outcomes such as intentions to engage in continuing positive behaviors, personal responsibility toward the environment, and environmental sensitivity (i.e., caring) about the environment.

1. *How do demographic factors including gender, state of residence, racial/ethnic affiliation, public/private school attendance, and grade level relate to students' ARSL?*
2. *How do educational programs (i.e., service-learning, and field trip experiences) influence students' ARSL?*
3. *How do service-learning program characteristics (as reported by teachers versus as perceived by students) affect students' ARSL?*
4. *How does ARSL relate to students' behavioral intentions, sense of personal responsibility, and environmental sensitivity?*

5. *How does using service-learning to fulfill a school requirement influence students' behavioral intentions, sense of personal responsibility, and environmental sensitivity?*

RESULTS¹

Demographic Factors and ARSL

The following tables describe the results of one model examining the influence of demographic characteristics on students' ARSL. The dependent variable in this model was posttest ARSL. The demographic characteristics examined as independent variables include gender, state of residence, racial/ethnic affiliation, public/private school attendance, and grade level. This model also controlled for pretest ARSL and service-learning and field trip treatment conditions.

Gender and ARSL

Gender had a significant effect on ARSL, with female students reporting more positive attitudes (Table 3).

Table 3: Gender and ARSL

n	Male 920	Female 1146	F-value	df	p-value
Posttest ARSL Mean (Stand. Err.) ²	3.09 (.05)	3.34 (.05)	43.02	1/1939	<.001

The Posttest ARSL mean across all students was 3.21 (.02).

State of Residence and ARSL

There was no significant effect of state of residence on students' posttest ARSL (Table 4). This suggests that after participating in a CBF program, students who live in Maryland, where service-learning is a graduation requirement, do not differ in their ARSL from students who live in Virginia, where service-learning is not mandated.

Table 4: State of Residence and ARSL

n	Maryland 1365	Virginia 701	F-value	df	p-value
Posttest ARSL Mean	3.23 (.06)	3.19 (.06)	0.93	1/1939	.335

Racial/Ethnic Affiliation and ARSL

Racial/ethnic affiliation had a significant effect on students' posttest ARSL (Table 5). Students who identified themselves as Caucasian/White or who identified themselves as a member of a different racial group than those listed had more positive posttest ARSL than students who identified themselves as African American. One possible explanation

for this finding could be that African American students consider learning about and doing service to help the Chesapeake Bay as less relevant or important to their lives compared with non-African American students (Habib, 1996). Based on this possibility, an analysis was conducted to compare racial/ethnic group differences in the extent to which students felt that they were learning things that were important to their lives. However, there was no difference in how the different racial/ethnic groups rated this variable. Thus, differences in personal importance of the Chesapeake Bay do not explain the more negative ARSL of African American students. More research would be needed to eliminate other explanations for African American students' more negative ARSL found in this study; however, this finding provides preliminary evidence that African American students may be more likely to feel controlled by mandated service-learning than non-African American students are.

Table 5: Racial/Ethnic Affiliation and ARSL

	Afr. Am. / Black	Asian	Caucasian / White	Hispanic	Another Group	F-value	df	p- value 3
n	314	156	1361	86	149			
Posttest ARSL Mean	3.05 (.06)	3.17 (.08)	3.29 (.04)	3.25 (.09)	3.31 (.08)	5.67	4/1939	<.001

Significant differences: Caucasian>African American, Another Group>African American

Public/Private School Attendance and ARSL

Attending a public versus a private school did not have an effect on students' posttest ARSL (Table 6).

Table 6: Public/Private School Attendance and ARSL

n	Public 1761	Private 305	F-value	df	p-value
Posttest ARSL Mean	3.21 (.04)	3.22 (.07)	0.00	1/1939	.955

Grade Level and ARSL

Grade level did not have an effect on students' posttest ARSL scores (Table 7). Students in 6th, 7th, and 8th grade were not significantly different from each other on their posttest ARSL scores.

Table 7: Grade Level and ARSL

	6 th grade	7 th grade	8 th grade	F-value	df	p-value
n	467	1380	219			
Posttest ARSL Mean	3.22 (.06)	3.19 (.05)	3.24 (.08)	0.38	2/1939	.686

Service-learning and Field Trip Treatments and ARSL

This model testing the effects of service-learning and field trip treatments controls for pretest ARSL, and the demographic factors of gender and racial/ethnic affiliation.

Based on which service-learning treatment condition they participated in (i.e., *Grasses*, non-CBF service-learning project or no service-learning project) students reported different levels of posttest ARSL (Table 8). Non-CBF service-learning students and No service-learning students on average had more positive ARSL than students who participated in *Grasses*. This result supports the idea that service-learning cannot be thought of as a monolithic pedagogical approach with either universally positive or negative effects. Like all pedagogical approaches, service-learning can be implemented in various ways with different levels of success in achieving desired outcomes.

A related study using these data also suggested that the *Grasses* program led to comparatively low results for students in other outcomes such as fulfillment of personal goals as well (Covitt, in review). Underlying this result is the fact that the *Grasses* program does not follow many of the best practices of service-learning (Alliance for Service-learning in Educational Reform, 1995). For example, this pre-packaged program did not offer most students opportunities to choose their topic, to design their project, or to participate in hands on and meaningful work to help the Bay. This result suggests that it is not just pre-existing student characteristics that determine what students' ARSL will be. Not surprisingly, less positive service-learning experiences in school (whether required or not), can lead to less positive attitudes toward doing service as a part of school.

Table 8: Effect of Service-learning on ARSL

	<i>Grasses</i>	Non-CBF	No SL	F-value	df	p-value
n	829	463	774			
Posttest ARSL Mean	3.09 (.04)	3.31 (.05)	3.21 (.04)	8.02	2/1941	<.001

Significant differences: Non-CBF>*Grasses*, No SL>*Grasses*

Field trips had a significant effect on students' ARSL (Table 9). Students who participated in field trips had more positive posttest ARSL than students who did not go on field trips. This result does not represent an a priori hypothesis (i.e., that going on a

field trip will have a positive effect on students' ARSL). It is likely that this finding reflects positive affect toward the field trips students went on. Eyler (2000) suggests that service-learning experiences can lead to affective satisfaction on the part of students and teachers without necessarily leading to improvements in knowledge. Although enthusiasm and satisfaction are desired outcomes, it is important to ensure that students also have accurate knowledge so that they can put their enthusiasm to effective use. As with the analysis of service-learning treatments, this finding demonstrates that positive experiences with the Chesapeake Bay can influence positive attitudes toward service on behalf of the Bay.

Table 9: Effect of Field Trip on ARSL

n	FT 806	No FT 1260	F-value	df	p-value
Posttest ARSL Mean	3.29 (.04)	3.11 (.03)	18.52	1/1941	<.001

Teacher and Student Reported Program Characteristics and ARSL

The following analyses separately explore the effect that various conditions of required service-learning have on students' ARSL. The results reported here only include students in the service-learning treatment conditions. The models reported control for pretest ARSL, service-learning and field trip conditions, gender, and race.

The Effects of Teacher Reported Service-learning Program Characteristics on Students' ARSL

Required Service-learning

There was no difference in ARSL between students who were required to engage in service-learning in order to graduate and those who did not have a service-learning requirement (Table 10). This finding suggests that service-learning mandates such as the graduation requirement for Maryland public school students may not be perceived as unduly controlling by students. There are several potential explanations for why requirements may not be perceived as excessively controlling. First, it is possible that teachers are not emphasizing the requirement aspect of service-learning with their students. An alternative explanation could be that students are habituated to a variety of requirements in school. In this case, a requirement to work on an environmental or community project may be seen as interesting and exciting in comparison with other school requirements (e.g., homework, exams).

Table 10: Effect of Having a Service-learning Requirement on ARSL

n	No Req 392	Req 900	F-value	df	p-value
Posttest ARSL Mean	3.17 (.07)	3.23 (.05)	0.74	1/1212	.389

CBF as Required Service-learning

In addition to examining the effect of students having a service-learning requirement, this study also examined the particular case where teachers used CBF teaching units to fulfill students' service-learning requirements. This was true for a subset of students who had a general service-learning requirement. Again, no difference was found between students who engaged in required service-learning as part of their CBF unit and those who engaged in non-required service-learning as part of their CBF unit (Table 11). This finding represents further evidence that service requirements may not be perceived by students to be excessively controlling.

Table 11: Effect of Using CBF Programs to Fulfill a Service-learning Requirement on ARSL

n	No Fulfill 526	Fulfill 766	F-value	df	p-value
Posttest ARSL Mean	3.18 (.06)	3.23 (.05)	0.46	1/1212	.498

Recording Students' Service-learning Hours

Because Deci and Ryan's (1985) cognitive evaluation theory suggests that it is the perception of external control, rather than the actual level of control that leads to a decrease in intrinsic motivation, the effect of recording individual students' service-learning hours was also examined. It was hypothesized that the recording of hours could serve to make service-learning requirements more salient, and thus more perceptually controlling. However, no difference in ARSL was found between students' whose hours were recorded and students' whose hours were not recorded (Table 12). Again, it is possible that the students did not perceive the policy of recording hours as unduly controlling. Because students are habituated to having their schoolwork recorded, the recording of service hours may not have seemed any more controlling than other assignments in school.

Table 12: Effect of Recording Students' Service-learning Hours on ARSL

n	No Recording 617	Recording 596	F-value	df	p-value
Posttest ARSL Mean	3.26 (.05)	3.20 (.05)	1.20	1/1137	.274

Opportunities for Reflection

Some proponents of mandated service-learning suggest that service-learning mandates are functionally different from community service requirements due to the unique qualities of service-learning (Andersen & Murphy, 1999). One such difference between community service and service-learning is the inclusion of a reflective component into service-learning experiences. Students who reflect on their service-learning experiences should have greater opportunities to integrate service into their self-identities (leading to a perception that service is an intrinsic part of their identity rather than an externally controlled behavior). Thus, it was hypothesized that students in classes that used reflection would have more positive ARSL.

In this study, teachers were asked whether or not they used reflection activities about service-learning experiences with their students. There was no difference in students' ARSL based on whether or not their teacher reported using reflection activities in class (Table 13).

Table 13: Effect of Providing Opportunities for Reflection on ARSL

n	No Reflection 363	Reflection 894	F-value	df	p-value
Posttest ARSL Mean	3.12 (.07)	3.22 (.05)	2.62	1/1179	.106

Opportunities for Student Choice

Service-learning is a complex pedagogical approach that may be implemented in a variety of ways. Even if service-learning is mandated, the implementation of a service-learning program may provide numerous opportunities for students to be self-directed and autonomous. For example, teachers may provide students with choices about what service they engage in. In addition, students may be included in the process of planning and developing a service project. If sufficient opportunities for autonomy are provided within their service-learning experience, students who are required to engage in service-learning may not feel externally controlled. Thus, it was hypothesized that regardless of whether or not service was mandated, students who were provided with choices about their service-learning would have more positive ARSL.

Teachers were asked whether or not they provided their students with choice about service-learning projects and studies. There was no difference in ARSL based on this teacher reported program characteristic (Table 14).

Table 14: Effect of Providing Choice about Service-learning Projects and Studies on ARSL

n	No Choice 782	Choice 431	F-value	df	p-value
Posttest ARSL Mean	3.24 (.05)	3.22 (.06)	0.10	1/1137	.755

Summary of Teacher Reported Program Characteristics and ARSL

None of the program characteristics reported by the teachers had an effect on students' ARSL. However, as is evidenced below, students' perceptions of similar program characteristics had a strong relation with their ARSL. These findings indicate a disconnect between the pedagogical approaches that teachers believe they are using with students and the educational environments that students are perceiving.

The Relation between Student Perceptions of Program Characteristics and Students' ARSL

Having Opportunities for Choice

Students reported to what extent they felt they had opportunities to make their own decisions about aspects of their service-learning projects. Based on their responses, students were divided into a low choice group and a high choice group. Students who reported that they had more opportunities to make their own decisions about important aspects of their service-learning projects had more positive ARSL (Table 15). This finding contrasts with the teacher reported choice model, where no difference in ARSL was found.

Table 15: Effect of Students' Perception of Having Choice on ARSL

n	Low Choice 831	High Choice 453	F-value	df	p-value
Posttest ARSL Mean	3.07 (.04)	3.46 (.05)	63.37	1/1203	<.001

Having Opportunities to Talk about or Write about Helping the Bay

To gauge the amount of reflection that students engaged in during their service-learning experience, students were asked to what extent they felt that their teacher gave them opportunities to talk about or write about how they helped the Bay. Based on their responses, students were divided into a low talk/write group and a high talk/write group. Students in the high talk/write reflection group reported more positive ARSL than the students in the low talk/write reflection group did. This finding contrasts with the teacher reported reflection model, where no difference in ARSL was found.

Table 16: Effect of Students' Perception of Having Opportunities to Talk/Write on ARSL

n	Low Talk 720	High Talk 562	F-value	df	p-value
Posttest ARSL Mean	3.06 (.04)	3.41 (.05)	55.65	1/1201	<.001

Having Opportunities to Think about Helping the Bay

Students were also asked to what extent they felt that their teachers gave them opportunities to think about how they helped the Bay. This question was included to explore a slightly different facet of reflection. Based on their responses, students were divided into two groups. As with the talk/write reflection groups, students in the high think reflection group reported more positive ARSL than students in the low group did (Table 17). Although the difference between these findings and the results of the teacher reported reflection model make it difficult to support a causal relation between reflection and ARSL, these results do support a correlational relation between reflection and ARSL. Students who feel that they have opportunities to reflect about their service have more positive ARSL.

Table 17: Effect of Students' Perception of Having Opportunities to Think on ARSL

n	Low Think 693	High Think 588	F-value	df	p-value
Posttest ARSL Mean	3.05 (.04)	3.41 (.05)	63.16	1/1200	<.001

ARSL and Environmental Education and Service-learning Outcomes

The results presented in the previous sections demonstrate that various factors may influence students' ARSL. For instance, gender and racial/ethnic affiliation were demographic characteristics that contributed to ARSL. Service-learning and field trip treatment groups influenced ARSL as well. Finally, students' perceptions of service-learning program characteristics were strongly related to their ARSL.

While the results presented thus far demonstrate some of the different factors that relate to and lead to students' ARSL, it is also important to understand what effects ARSL will have on environmental education and service-learning outcomes such as intentions to help, personal responsibility to help, and environmental sensitivity (i.e., caring). To the extent that students' ARSL relates to these outcomes, a case can be made for the importance of designing service-learning that will foster positive ARSL. With this purpose in mind, several models were run to examine the relation between ARSL and outcome variables.

ARSL and Intentions⁴

In order to assess the effect of posttest ARSL on students' intentions, students were split into low and high posttest ARSL groups based on a median split. Students in the high posttest ARSL group reported significantly higher intentions to help the Bay than students in the low posttest ARSL group (Table 18). This finding supports Deci and Ryan's (1985) cognitive evaluation theory suggesting that when individuals feel that they

are being externally controlled to engage in certain behaviors, their intrinsic motivations to engage in those behaviors will be lessened.

Table 18: Effect of Posttest ARSL on Intentions

n	Low ARSL 950	High ARSL 1114	F-value	df	p-value
Intentions Mean	2.05 (.03)	2.41 (.03)	150.55	1/1937	<.001

ARSL and Personal Responsibility and Environmental Sensitivity⁵

In order to assess whether ARSL was related to variables other than intentions and behaviors, additional models were tested to examine how ARSL relates to student reports of personal responsibility to help the Bay and environmental sensitivity (i.e., caring) for the Bay.

There was a strong positive relation between students' posttest ARSL and their sense of personal responsibility to help the Bay (Table 19). Thus, ARSL not only relates to students' intentions, it also relates to whether or not they feel personally responsible for helping to protect the Chesapeake Bay environment.

Table 19: Effect of Posttest ARSL on Personal Responsibility

n	Low ARSL 950	High ARSL 1115	F-value	df	p-value
Personal Responsibility Mean	2.51 (.04)	2.96 (.04)	109.50	1/1938	<.001

As with intentions and personal responsibility, results supported a strong positive relation between students' ARSL and their level of environmental sensitivity (Table 20). Students who felt less negative about required service-learning reported more positive caring feelings about the Chesapeake Bay and the natural areas and species in and around the Bay.

Table 20: Effect of Posttest ARSL on Environmental Sensitivity

n	Low ARSL 923	High ARSL 1086	F-value	df	p-value
Environmental Sensitivity Mean	2.93 (.04)	3.45 (.04)	173.90	1/1882	<.001

Required Service-learning and Intentions to Help the Bay, Personal Responsibility to the Bay, and Environmental Sensitivity

The final set of results examines the effect of required service-learning on student outcomes. Cognitive evaluation theory suggests that external controls such as mandatory service-learning can lead to decreased intrinsic motivation because individuals perceive that they are being controlled, and are resistant to such control. However, because teacher reports of whether or not Chesapeake Bay service-learning was used to fulfill a service-learning requirement did not influence students' ARSL (i.e. perceptions about required service-learning) in this study, it seemed unlikely that required service-learning would directly influence students' outcome variables. In fact, this result was supported and no outcome variable differences were found between students who did and did not engage in Chesapeake Bay service-learning in order to fulfill a requirement (Tables 21, 22, and 23). These analyses only include students who participated in service-learning.

Table 21: Effect of Using Service-learning to Fulfill a Requirement on Intentions

n	No Fulfill 526	Fulfill 766	F-value	df	p-value
Intentions Mean	2.32 (.05)	2.27 (.04)	0.56	1/1210	.453

Table 22: Effect of Using Service-learning to Fulfill a Requirement on Personal Responsibility

n	No Fulfill 526	Fulfill 766	F-value	df	p-value
Personal Responsibility Mean	2.84 (.06)	2.75 (.05)	2.26	1/1210	.133

Table 23: Effect of Using Service-learning to Fulfill a Requirement on Environmental Sensitivity

n	No Fulfill 516	Fulfill 740	F-value	df	p-value
Environmental Sensitivity Mean	3.29 (.05)	3.25 (.05)	0.57	1/1174	.452

IMPLICATIONS AND RECOMMENDATIONS

This study substantially supported cognitive evaluation theory, which suggests that high perceptions of external control decrease individuals' intrinsic motivation. Service-learning requirements did not negatively impact student outcomes of behavioral intentions, personal responsibility, and environmental sensitivity per se. However, students' ARSL did. ARSL can be thought of as a surrogate for perception of external control. It is reasonable to expect that students who report that requiring service is a good idea and that they would serve even if they didn't have to, will be more likely to attribute their participation to their own positive beliefs about service, rather than to the external control of a requirement.

Because students' ARSL and perceptions of choice rather than teacher reported levels of requirements and choice were related to outcomes, one might conclude that students bring with them propensities to feel more or less controlled and that what happens in the classroom does not matter. However, this conclusion is challenged by the fact that students who participated in one particular program (i.e., *Grasses*) reported more negative ARSL and felt that they had fewer opportunities to make decisions about their service than students whose teachers had developed their projects. Thus, this study demonstrated both that different service-learning programs can lead to different perceptions of external control, and that these perceptions of external control are strongly related to student outcomes such as behavioral intentions, personal responsibility, and environmental sensitivity.

In practical terms, the results of this study do not suggest that service-learning requirements adversely affect student outcomes such as intentions to continue helping after a service-learning experience. However, findings suggest that service-learning programs that do not support autonomy can have negative impacts on student outcomes. Furthermore, certain groups of students (e.g., male students) may be particularly vulnerable to potential negative impacts of mandated service-learning. The fact that students' perceptions of being controlled (i.e. ARSL and perception of choice) are strongly related to student outcomes indicates that attention to autonomy and self-direction in service-learning is a vital component of providing students with effective and meaningful experiences.

The following recommendations describe some ways in which autonomy supporting program characteristics may be integrated into service-learning programs to enhance their effectiveness and reduce students' perceptions of being externally controlled. For the most part, these recommendations are applicable to the design and implementation of both mandated and non-mandated service-learning experiences.

Recommendations for Practice

- ◆ *Provide opportunities for autonomy and self-direction within all service-learning experiences.*

In this study, students with more negative ARSL and low perceived choice in their service-learning experiences reported lower levels of intentions, personal responsibility, and environmental sensitivity. Thus, autonomy is an important element for service-learning programs. By designing and implementing experiences that intentionally provide opportunities for student autonomy and self-direction, service-learning programs will be more successful at fostering desired outcomes. Examples of ways to integrate autonomy and self-direction into service-learning could include some of the following:

- Students can be included in the process of choosing a service-learning topic. If teachers are limited in the number of topics and projects that can be addressed in a classroom, a democratic decision-making process can be used to choose a topic or project.
 - Student voice in decision-making processes can be valued and given equal consideration as adult input.
 - Students can be encouraged to explore a broad problem space before choosing one course of action for a service project.
 - Teachers can use non-controlling language and guidance, focusing on multiple options and creative solutions rather than narrowly delineated information and instructions.
- ◆ *Provide opportunities for guided reflection to help students strengthen their self-identification as intrinsically motivated helping people.*

The students in this study who felt they had greater opportunities to reflect about their Chesapeake Bay service also reported higher levels of intentions, personal responsibility, and environmental sensitivity. Similarly, in a 1995 study Eyler and Giles (cited in Eyler & Giles, 1997) found that structured reflection was a predictor of personal growth, social commitment, and interpersonal growth. Reflection can help students assimilate their service experiences into their personal identities. Without reflection, students in mandated service-learning programs may attribute their service behaviors to the requirement rather than to their desire to serve.

Reflection may serve a variety of purposes in service-learning, but in order to foster an intrinsic motivation to engage in service, certain reflection structures may be helpful. For example, by considering how what they did contributed to solving a problem, students can develop an identity as a problem-solver. By applying their experiences to new situations, students may learn that service is a lifelong pursuit that provides continual opportunities for challenges and rewards. Reflection activities should be structured to guide students toward specific behavioral, cognitive, and affective outcomes.

- ◆ ***If service-learning mandates are implemented, teachers should focus on service, learning, and reflection rather than on the requirement.***

Cognitive evaluation theory suggests that it is the *perception* of external control, rather than *actual* external control that undermines individuals' intrinsic motivation. Thus, if service-learning mandates are used, it is important to minimize the saliency of external control that students experience. Strategies for limiting the saliency of external control could include focusing on service, learning and reflection rather than graduation requirements for service; not requiring a record of student hours served; or being flexible about how students may fulfill their requirement.

- ◆ ***Be sensitive to the potential that mandates may differentially affect various groups of students and individuals.***

In this study, males and African American students had more negative ARSL than other students. Previous research also found that groups and individuals can have varying reactions to service mandates (e.g., Stukas, et al., 1999; Miller, 1994). In some cases, the concern that service mandates may adversely affect the attitudes and behaviors of certain groups of students may be enough to prevent the use of requirements altogether.

One alternative for implementing mandated service-learning with sensitive groups could be asking students to serve rather than requiring them to do so. Independent Sector (1996) research suggests that most individuals are very receptive to the idea of engaging in service when they are personally requested to do so. When students are asked to serve instead of required to serve, they are likely to feel needed and valued rather than controlled.

- ◆ ***Develop and implement teacher professional development programs to ensure that teachers have the skills, resources, and support necessary to implement effective, autonomy-supportive service-learning experiences with their students.***

Although not directly addressed in this study, the topic of autonomy-supportive service-learning has implications for teachers as well as students. Service-learning (especially service-learning that follows the best practice of including students in planning) represents a distinctly new approach to instruction for most teachers. Many teachers are apprehensive about turning over "control" to their students. Thus, they may not implement autonomy related best practices of service-learning with their students, instead deciding on project topics and project roles for their students themselves.

To help ensure that teachers will implement service-learning best practices (including autonomy-supportive practices) within their service-learning instruction, more than guidelines for quality service-learning will be needed. Research on teacher professional development suggests that specific and intensive types of training are

required to help teachers effectively adopt new instructional practices (Birman, Desimone, Porter, & Garet, 2000). For many teachers, using service-learning requires the adoption of a variety of new instructional practices such as problem-based instruction and taking learning outside of the classroom. The effective approaches to teacher professional development described below were adapted from Birman, et al. 2000):

- *Collective Participation*: Professional development is more successful when it focuses on teachers from the same school subject, or grade. When participating teachers share similar interests, they can work together to share resources and help each other to plan and integrate service-learning into their teaching. Teacher leaders who have had successful experience with service-learning can also be extremely helpful. Model teachers provide insight, resources, mentoring, and feedback to teachers who are new to service-learning. These types of participation and support can provide teachers with examples of how other teachers successfully integrate autonomy-supportive approaches into their service-learning instruction.
- *Duration*: Helping teachers to become effective service-learning facilitators takes longer than a day or a week. Professional development that extends over a considerable length of time (e.g., a year) can provide teachers with opportunities to continually share progress, challenges, and resources. Longer duration also allows teachers to integrate complex information about teaching and learning issues into their instruction with greater success. Having this type of continuing professional development training can help teachers overcome their fears and difficulties associated with making their classroom teaching more autonomy-supportive.
- *Active Learning*: Service-learning proponents take for granted that active learning is good learning. However, when it comes to professional development, there is rarely sufficient time for teachers to participate in active learning about effective service-learning instruction. Birman, et al. (2000) suggest that active learning includes things like observing other teachers and being observed, working on lesson plans and implementation during training, and practicing teaching in simulated conditions. Active learning helps teachers turn instructional theory into instructional practice.

A few additional considerations for professional development to help teachers to adopt autonomy supportive service-learning instructional approaches include the following:

- *Frame service-learning as problem-solving*: Problem-solving is a pedagogical approach that can be structured to help students learn and progress, while at the same time providing opportunities for choice, self-direction, and exploration (e.g., Bardwell, Monroe, & Tudor, 1994; Lieberman & Hoody, 1998). In contrast, a program like *Grasses* provides students with a problem that is already defined and

a solution that is already determined. If a goal of service-learning is to help students to become effective real world problem-solvers, then professional development will need to help teachers develop service-learning experiences that will engage students in all steps of the problem-solving process.

- *Develop a meaningful approach to engaging students in reflection:* Research has demonstrated that reflection is an important component of service-learning and that reflection can help students develop an internal location of causation for their helping behaviors. However, in order to be effective, reflection activities need to be carefully designed. Professional development training can help teachers develop reflection activities for achieving specific goals, including developing students' self-identification as service-oriented individuals.

Recommendations for Future Research

This study adds to our understanding of how service-learning mandates influence students' attitudes and intentions. The study resulted in new insights and perspectives but also raised more questions. In the end, there will likely never be a definitive answer concerning whether or not mandated service-learning should be implemented in schools around the nation. However, additional research and exploration of this topic can help policy-makers, administrators and teachers make better decisions about whether or not to mandate service-learning for their students, and about how to design and implement service-learning to mitigate any potential harm that might be done by mandates. Some questions that merit further exploration include the following:

- *Is mandated service-learning more appropriate for certain age groups?*

This study only explored the topic of attitudes toward required service-learning among middle school students. It is possible that there are some developmental levels that are more or less appropriate for implementing mandated service-learning programs.

- *How does the amount of student choice in mandated service-learning programs influence ARSL?*

Although researchers have suggested that providing opportunities for autonomy and choice within mandated service-learning experiences may ameliorate potential negative effects of mandates, no studies have specifically tested this proposition. It is even possible that there is such a thing as too much autonomy, and that students who are given too many choices about service-learning experiences may have trouble effectively focusing on one problem or one solution. Research on this topic can help educators identify appropriate levels of choice and autonomy to provide to students.

- *Can a lack of autonomy in service-learning experiences impact students' problem-solving ability as well as their attitudes and behaviors?*

Although this study focused on students' intentions and attitudes, previous research has suggested that controlling teaching strategies can adversely affect students' performance of tasks such as problem-solving (Boggiano, et al., 1993). Because fostering problem-solving ability is an important service-learning goal, further exploration of this topic is warranted.

- *How do service-learning mandates affect the instructional practices of teachers?*

Students are not the only individuals who are affected by service-learning mandates. When service-learning is mandated, students are required to engage in service *and* teachers are required to implement a new, time and resource intensive, and possibly intimidating instructional approach in their classrooms. As with students, there are likely both pros and cons associated with teachers having to use service-learning. It is possible that service-learning mandates can help teachers transition to instructional approaches that match many of the goals of education reform. Alternatively, service-learning requirements may influence teachers to use service-learning projects that are easy to implement but that do not follow service-learning best practices. In this instance, service-learning mandates may actually lead to a decrease in the quality of instruction that students experience. Research concerning the empirical effects of service-learning mandates on teachers and instructional quality will provide an important source of information for administrators and educators deciding whether or not to establish service-learning requirements in their schools.

CONCLUSION

This study provides new and useful insights into a remarkably complex topic. As policymakers, administrators, and educators continue to grapple with the question of how best to integrate service-learning into schools, it is my hope that they will pay careful attention to the implications that these decisions have for students and teachers. Mandated service-learning may not lead to the decrease in intrinsic motivation that opponents warn of, but on the other hand, it cannot be expected that mandates in and of themselves will lead to positive outcomes. In the end, it may not be of paramount importance whether service-learning is required or freely chosen. In order to achieve the goals of fostering moral development, problem-solving skills, and civic commitment, what likely matters most is the thoughtful design and implementation of service-learning experiences that provide students with opportunities to learn, explore, reflect, grow and contribute to society in a personally meaningful way.

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¹ Differences in overall N for models is due to individuals having missing data for specific variables included in the models.

² All of the tables report means followed by standard errors.

³ A Bonferonni Adjustment was used in comparisons with more than two means.

⁴ The model testing the effect of posttest ARSL on intentions to help the Bay controls for which treatment group the students were in (i.e., field trip and service-learning conditions), pretest levels of intentions and past behaviors, and demographic characteristics of gender and racial/ethnic affiliation.

⁵ The model testing the effect of posttest ARSL on personal responsibility to help the Bay controls for which treatment group the students were in, pretest levels of personal responsibility and past behaviors, and demographic characteristics of gender and racial/ethnic affiliation. The model testing the effect of posttest ARSL on environmental sensitivity controls for which treatment group the students were in, pretest levels of environmental sensitivity and past behaviors, and demographic characteristics of gender and racial/ethnic affiliation.