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Adolescents' decision making in social situations
A self-regulation perspective

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Abstract

Two studies investigated the utility of the Self-Regulation Model of Decision Making (SRMDM) for explaining and predicting adolescents' decision making in social situations. Participants were mostly ninthth and eleventh graders, with a first study consisting of all boys and a second similar study composed of boys and girls. Measures included a new assessment of decision-making skill (the Decision-Making-Competency Inventory or DMCI), the Weinberger Adjustment Inventory (WAI), an importance assessment of social–relational goals, and peer ratings of social behavior. Results across both studies showed that adolescents' valuing of social–relational goals and their decision-making competency were typically the best predictors of their social behaviors. The results also showed that adolescent girls — especially the older ones — were the most affirming of socially competent behavior whereas older adolescent boys tended to be the least affirming of this. Older adolescent girls also scored highest on the DMCI, which was found to have adequate psychometric properties. © 2001 Elsevier Science Inc. All rights reserved.

Keywords: Decision making; Self-regulation; Social goals; Adolescent behavior; Gender differences; Age differences

1. Introduction

Decision making can be defined as the process of choosing a course of action from among two or more alternatives while in the midst of pursuing one's goals (Byrnes, 1998). This ability

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is an important one to study because people's decisions can lead to consequences that critically impact their own lives, the lives of others, and society at large. Correspondingly, parents and educators have become increasingly concerned about adolescents' decision making given the increases that have occurred in this age group for problems such as violent crime, suicide, out-of-wedlock teen pregnancies, and HIV infection (DiClemente, Hansen, & Ponton, 1995).

In an effort to promote increased insight into decision making, a number of decision-making theories and models have been advanced. Some of the earliest models (e.g., Expected Utility theory) were based on the assumption that an optimal decision could be arrived at in a very rational, mathematical sort of way. Over time, however, researchers discovered that people often do not make decisions very rationally due to inherent constraints on the mental and judgmental capacities of the human mind (Kahneman, Slovic, & Tversky, 1982; Nisbett & Ross, 1980; Simon, 1986). As such, the early models were soon replaced by alternative, non-normative conceptions that were designed to account for the suboptimal character of everyday decision making (e.g., Janis & Mann, 1977). In the past few years, however, these replacement models have been shown to have their own problems, such as not being able to explain the development of decision making (see Byrnes, 1998). In an effort to overcome many of the shortcomings of prior models, the Self-Regulation Model of Decision Making (SRMDM) has recently been proposed (Byrnes, 1998; Byrnes, Miller, & Reynolds, 1999; Miller & Byrnes, 1997).

The SRMDM is based on rational task analysis and the insights of self-regulation scholars in numerous disciplines (e.g., emotion researchers, education researchers, etc.). It describes the self-regulated decision maker as a person who sets adaptive goals and takes appropriate measures to achieve such goals. This process involves generating, evaluating, selecting, and learning from goal-directed choices while simultaneously managing the limitations, biases, and personal tendencies that may otherwise interfere with the attainment of adaptive goals (Byrnes, 1998). This conceptualization is consistent with the main idea of the self-regulation theory — that individuals cannot effectively adapt to their environment until they establish a sense of control over their psychological processes and behavior (Schunk & Zimmerman, 1994). For the decision maker, this sense of control is precipitated by changes in one's understanding of effective and ineffective forms of decision making. These changes, in turn, promote the implementation of strategies to overcome factors that lead to errors in decision making (e.g., seeking advice from knowledgeable others when knowledge is lacking; using self-talk strategies to abate one's impulsiveness).

The present research attempts to assess the utility of the SRMDM in explaining and predicting adolescents' decision making. Adolescence was chosen as the target age period because, among other things, it is a transitional time when individuals spend an increasing amount of time in unmonitored, risk-promoting contexts (Miller & Byrnes, 1997). In such contexts (e.g., a party involving alcohol), adolescents have to be able to make good decisions on their own. The teenage years, then, represent a "proving ground" for adolescents in the sense that they are given opportunities to use their own judgment and then experience the consequences of their decisions. In our view, two key developmental questions in this regard are the following: (a) to what extent do adolescents implement effective decision-making skills? (b) are there age and gender differences with respect to such competencies?

2. The will to decide: goals that are valued

2.1. Social–relational goals

As suggested earlier, valuing adaptive goals is an essential part of being a self-regulated decision maker. Thus, it is useful to consider the presence of developmental and gender differences in this regard. The current research will focus on the valuing of adaptive social–relational goals because this represents one key context in adolescents' decision making. We define social–relational goals as those that are oriented toward the maintenance of harmonious and benevolent relationships (e.g., being considerate of others). The valuing of such goals can be used as an index of an individual's degree of self-regulation. Whereas those who are generally self-regulated value harmonious social relationships, those who are more dysregulated do not (Byrnes, 1998). Of course, adolescents should not value social relations to the detriment of academic success and other desirable outcomes (Klaczynski & Reese, 1991; Wentzel, 1991).

There has been very little developmental research specifically looking at young people's valuing of social–relational goals. Instead, the literature on social development has been dominated by studies investigating prosocial and antisocial behaviors (see, e.g., Coie & Dodge, 1998; Eisenberg & Fabes, 1998) or goals within a single age group (Wentzel, 1991). This seems surprising given the fact that researchers have recognized the importance that the values and goals of young people serve in translating social skills into competent social behavior (Allen, Weissberg, & Hawkins, 1989; Parkhurst & Asher, 1985). The few studies that have looked developmentally at the valuing of social–relational goals have generally found that there is a developmental difference that favors older children (e.g., Crick & Ladd, 1990; Renshaw & Asher, 1983). However, the results are not uniform across studies and some research shows that there is a developmental increase in certain tendencies such as competition, where the goal is to not cooperate with others (Eisenberg & Fabes, 1998; Miller & Byrnes, 1999).

With respect to gender differences, a majority of studies suggest that girls are more affirming of social–relational goals than boys (Boldizar, Perry, & Perry, 1989; Crick & Ladd, 1990; Miller & Byrnes, 1999). There is, however, reason to question this assumption. First of all, some studies investigating prosocial goals and altruistic behavior have not found any significant gender differences (e.g., Moore & Eisenberg, 1984; Renshaw & Asher, 1983). Second, in their meta-analysis of prosocial behavior, Eisenberg and Fabes (1998) found that there was a significant difference favoring females as more prosocial, but the effect size was modest (mean unweighted effect size = 0.18) and smaller than that found for a developmental difference.

In sum, studies have generally found that girls and older children value social–relational goals more than boys and younger children, respectively. But these assumptions are tentative, particularly with respect to the developmental findings, given the fact that several studies have not found any gender differences and other studies have found that younger children are more affirming of cooperative social behavior than older children. Furthermore, very little of this research has been done with high school populations, which will be the focus of this inquiry.

2.2. Relationship between goals and behavior

As suggested earlier, it is assumed that there is a relationship between the goals people value and the decisions they make. Thus, if there are developmental and gender differences in adolescents' valuing of particular goals, then comparable differences should exist in the choices they make related to those goals. It would be expected, then, that adolescents' valuing of social–relational goals would be related to and predictive of their social behaviors. In support of this claim, numerous studies investigating the link between social goals and behavior have found that social competence and popularity among peers are significantly related to the valuing of positive relational goals. On the other hand, social maladjustment and peer rejection are associated with the devaluing of empathic peer relationships and an endorsement of social goals that center around dominance and hostility (Boldizar et al., 1989; Renshaw & Asher, 1983). It is expected that the present set of studies will validate prior findings suggesting that adolescents' valuing of social–relational goals is significantly related to and predictive of socially competent behavior.

3. The skill to decide: regulation of moderating factors

From a self-regulation perspective, simply valuing something is not enough to optimize one's chances of attaining it. It is also necessary before, during, and after decision making for the individual to optimally utilize limited resources and avoid falling prey to constraining influences. In this way, decision makers can effectively manage their limitations, biases, and personal tendencies that may otherwise interfere with the attainment of adaptive goals (Byrnes, 1998). Prior studies have explored how various moderating factors can affect people's decision making (Byrnes, 1998; Byrnes et al., 1999; Miller & Byrnes, 1997). By "moderating factors," we mean resources that adolescents can draw on to make good decisions (e.g., advice from knowledgeable individuals) as well as disruptive factors that make it difficult to make good decisions (e.g., impulsivity). A major question in the present research was whether adolescents tend to tap into resources and use strategies to overcome constraints when important decisions are at stake. The cognitive–developmental literature generally suggests that such skills might be more effectively utilized with age (see Miller, 2000).

In addition, it was of interest to determine whether the major tenets of the SRMDM would fit into a tripartite framework that comes from the literature on self-regulated learning (Schunk & Zimmerman, 1994). Just as self-regulated learners have been characterized as actively participating in their own learning process "metacognitively, motivationally, and behaviorally" (Zimmerman & Martinez-Pons, 1986, p. 614), it can likewise be said that self-regulated decision makers are those who actively participate in their own decision-making process metacognitively (e.g., they take time to evaluate their options; they learn from prior decisions), motivationally (e.g., they are confident in their ability to make good decisions), and behaviorally (e.g., they seek out necessary knowledge; they implement strategies to manage their emotions). A primary aim of the present set of studies is to develop a measure of

decision-making competency based on the major tenets of the SRMDM and the present conceptualization about metacognitive, motivational, and behavioral aspects of self-regulated learning. It is hypothesized that this competency, or skill, component of decision making will predict adolescents' social behaviors over and beyond their valuing of social–relational goals. This finding is expected to occur because self-regulated tendencies (i.e., drawing on resources and using strategies to overcome personal limitations) help an adolescent discover and select behaviors that are likely to lead to successful social relationships. In effect, self-regulated tendencies may serve as a "bridge" between goals and behaviors.

In sum, the objectives of the present set of studies are as follows:

1. To develop and evaluate a new measure of decision-making competency that will be assessed in terms of its reliability, factor structure, and validity.
2. To extend prior findings by assessing developmental and gender differences with respect to adolescents' decision-making competency and their valuing of social–relational goals. Based on prior research, it is hypothesized that older adolescents will show a higher level of decision-making competency than younger adolescents (tested in Studies 1 and 2), and girls will show a greater valuing of social–relational goals than boys (tested in Study 2 only).
3. To examine the relationship between what adolescents say is important to them from a social–relational standpoint and their apparent social behaviors. It is hypothesized that adolescents' social behaviors will be positively related to valuing the goals that underlie such behaviors.
4. To assess whether adolescents' valuing of social–relational goals and their decision-making competency predict their social behaviors. It is hypothesized that both will be unique predictors of their social behaviors.

4. Study 1

This first of two studies was conducted to provide an initial test of the SRMDM as applied to adolescents' decision making in the social arena. We tested the SRMDM in the following way. First, we used the model to create two measures, one assessing adolescents' valuing of social–relational goals and a second assessing some key aspects of their decision-making competency. Then we gave these measures and a measure of social competence to a sample of high school students.

4.1. Method

4.1.1. Participants

Data were collected from 412 ninth-($n = 221$) and eleventh-($n = 191$) grade adolescent boys from an all-male parochial school in the Washington, DC, metropolitan area. The sample was racially diverse, being 51% White, 32% Black, 8% Asian or Pacific Islander, 5% Hispanic, 2% American Indian, and 2% other.

4.1.2. Measures

4.1.2.1. Valuing of social–relational goals. As part of a larger study (Miller, 2000), an eight-item, importance assessment of social–relational goals was created and administered to all participants. Example items are, "How important to you is it that you get along with other people?" and "How important to you is it to be helpful to other people?" Cronbach's α for this assessment was .78. These responses were scored from 1 (*not important*) to 4 (*very important*). Responses were summed across items to arrive at a composite score. Higher scores reflect greater valuing of social–relational goals.

4.1.2.2. Social behavior. As an assessment of adolescents' social behavior, the Restraint scale of the Weinberger Adjustment Inventory (WAI) was administered to all participants. This 30-item assessment asks individuals to indicate on a five-point scale how 1 (*false*) or 5 (*true*) each statement is for them. The Restraint scale consists of the following four subscales: Suppression of Aggression (e.g., "I lose my temper and 'let people have it' when I'm angry."), Impulse Control (e.g., "I become 'wild and crazy' and do things other people might not like."), Consideration of Others (e.g., "I often go out of my way to do things for other people."), and Responsibility (e.g., "I make sure I stay out of trouble."). After reverse-scoring relevant items, responses were summed across items to arrive at subscale scores and a total restraint score. Individuals with higher scores reported engaging in more socially competent behaviors. Prior studies have shown the WAI to be internally consistent, to have good test–retest reliability, and to correlate well with other indicators of social competence (Wentzel, Weinberger, Ford, & Feldman, 1990). As was found in prior research, the Restraint scale was found to be internally consistent in the present study (Cronbach's α=.91). On the individual subscales, the Cronbach's α's were as follows: Suppression of Aggression=.83, Impulse Control=.77, Consideration of Others=.78, Responsibility=.85.

4.1.2.3. Decision-making competency. To assess some key aspects of adolescents' decision-making skill, the Decision-Making-Competency Inventory (DMCI) was created and administered to all participants. In completing the DMCI, participants are asked to report on their manner of decision making when faced with big decisions. Pilot data were initially collected to arrive at representative examples of big decisions for this age group (e.g., deciding who to hang around with or who to date; making decisions about sex, alcohol, and drugs), and these were provided in written form at the top of the instrument. Respondents are asked to indicate on a five-point scale how much like them each statement is, with choices ranging from 1 (*not at all like me*) to 5 (*very much like me*).

Based on the prior discussion about the SRMDM and the literature on self-regulated learning, 30 items were developed around three subscales — a Metacognitive subscale (e.g., "When I have a big decision to make, I think about similar past decisions I made and what happened."), a Motivational subscale (e.g., "When I have a big decision to make, I usually believe that I will make a good decision."), and a Behavioral subscale (e.g., "When I have a big decision to make, I usually seek out advice from people whom I know to be knowl-

edgeable.''). After reverse-scoring relevant items, responses were summed across items to arrive at a composite score. Higher scores correspond to individuals characterized by a high level of decision-making competency.

The DMCI was found to be internally consistent (Cronbach's α=.86). However, confirmatory factor analysis revealed that the data did not fit well to the proposed three-factor model represented by Metacognitive, Motivational, and Behavioral subscales [χ^2(402, N=392)=1753.92, P>.001; CFI=0.582; RMSEA=0.093 with confidence interval of 0.088 to 0.097]. Also, whereas the total score on the 30-item scale correlated with the WAI subscales as predicted, further analyses revealed that there were 10 items that did not highly correlate. When these items were subsequently deleted, the strength of the correlations uniformly increased. This deletion essentially had no effect on the internal consistency of the DMCI (i.e., Cronbach's α went from .86 to .85), nor did it bring about acceptable fit indices for the proposed three-factor model [χ^2(167, N=392)=786.27, P<.001; CFI=0.700; RMSEA=0.097 with a confidence interval of 0.090 to 0.104]. In both Studies 1 and 2, all analyses are reported for just the 20-item version (see Table 1 for the items).

Table 1
The 20-item Decision-Making-Competency Inventory (DMCI)

Items that start with the phrase, *When I have a big decision to make,*
1. ...I often make it without considering how likely it is that things will turn out OK. (−)
2. ...I take time to make sure that I am understanding things correctly.
3. ...I think about similar past decisions I made and what happened.
4. ...I take time to review all of my options before deciding.
5. ...I consider possible consequences before making any decision.
6. ...I usually hope that the problem goes away and that I don't have to make the decision. (−)
8. ...I make sure that I get all the facts.
9. ...I usually seek out advice from people whom I know to be knowledgeable.
10. ...I tend to rush into making it. (−)
11. ...I tend to forget important things when making the decision. (−)
13. ...I just choose what seems OK at the moment. (−)
14. ...I usually believe that I will make a good decision.
15. ...I just go with a decision that all my friends are going with. (−)
17. ...I am usually confident that things will turn out OK once I make the decision.
18. ...I like to let someone else make the decision for me (for example, my parents or a friend). (−)
19. ...I usually follow the advice of anyone who gives it to me. (−)
20. ...I make it and then pay attention to how it turns out.
Other items:
7. Whenever I have to make the same big decision, I tend to make the same mistakes. (−)
12. When I have a big decision to make about doing something that requires my skill, I often make a bad decision because I either underestimate or overestimate how good I am at something. (−)
16. When I have a big decision to make about doing something that requires a certain skill, I often don't bother to think about how much skill I have. (−)

(−) denotes reverse-scored items.
Taken from Miller (2000).

4.1.3. Procedure

Participants were administered a task booklet that first asked for the following demographic information: grade, age, race, current GPA, mother's highest level of education, and father's highest level of education. Race, GPA, and parents' educational attainment were assessed in a multiple-choice format to capture a full range of possible answers (e.g., for GPA, Choice A = below 2.0, Choice B = 2.0–2.49, etc.). Letter responses were then converted to form a corresponding numerical scale. These three variables were included as control variables in order to minimize other possible explanations beyond those proposed by the SRMDM (e.g., that observed differences in social behavior simply reflect differences by race, SES, or academic skill).

Next, the task booklet presented measures of achievement valuing and behavior (results not reported here), the Restraint scale of the WAI, the DMCI, and the importance assessment of social–relational goals (hereafter called SOCIAL-IMPORT scores). To control for order effects, three versions of the task booklet were made that had a different ordering of the measures. Administration of the task booklet was carried out during a normal class period, taking about 30 minutes to complete.

4.2. Results

The results are presented as follows: First, the validity and factor structure of the DMCI are assessed. Second, developmental differences with respect to the DMCI and adolescents' importance ratings of social–relational goals (SOCIAL-IMPORT) are evaluated. Third, the relationship between what adolescents say is important to them from a social–relational standpoint and their self-reported social behaviors is examined. Fourth, it is assessed whether adolescents' valuing of social–relational goals and their decision-making competency are both unique predictors of their self-reported social behaviors.

4.2.1. Psychometric properties of the DMCI

The concurrent validity of the DMCI was assessed by seeing how strongly the measure correlated with an established and widely used measure that indexes adolescents' social behaviors (i.e., the WAI). As shown in Table 2, the 20-item DMCI was positively correlated at both grades with scores on the Restraint scale of the WAI. Thus, adolescents who reported a higher level of self-regulated decision making also tended to report increased engagement in socially competent behaviors.

In evaluating the factor structure of the 20-item DMCI, a principal components factor analysis with varimax rotation identified four distinct factors that explained 52% of the variance in scores. The seven items that comprised Factor 1 (Informed Awareness) are primarily concerned with being reflective in the decision-making process and gathering adequate information in order to make an informed decision (items 2, 3, 4, 5, 8, 9, and 20). The five items of Factor 2 (Self-Appraisal) are primarily concerned with the tendency to be mindful of personal qualities that can affect the consequences of choices (items 1, 10, 11, 12, and 16). The six items of Factor 3 (Autonomy) center around a person's sense of self-determination in critically evaluating options and making a choice (items 6, 7, 13, 15, 18, and

Table 2
Study 1 (all boys): correlations by grade between the 20-item DMCI, the WAI, and SOCIAL-IMPORT scores

	Grade	
WAI subscales	9th	11th
Correlations between the DMCI and the WAI		
Suppression of Aggression	.32***	.19**
Impulse Control	.56***	.45***
Consideration of Others	.42***	.15 *
Responsibility	.54***	.39***
WAI combined subscales	.58***	.39***
Correlations between SOCIAL-IMPORT scores and the WAI		
Suppression of Aggression	.64***	.65***
Impulse Control	.33***	.25***
Consideration of Others	.67***	.59***
Responsibility	.51***	.48***
WAI combined subscales	.67***	.62***

"DMCI" stands for Decision-Making-Competency Inventory; "WAI" stands for the Restraint scale of the Weinberger Adjustment Inventory; "SOCIAL-IMPORT" stands for importance assessment of social–relational goals.

* $P < .05$.
** $P < .01$.
*** $P < .001$.

19). The remaining two items that comprised Factor 4 (Confidence) pertain to a person's level of self-confidence in making appropriate choices (items 14 and 17). Given the fact that these four factors were significantly correlated with each other (r's ranging from .20 to .59) and that the phrasing of the items appeared to be confounded with the factor structure (i.e., positively worded items loading with positively worded items; negatively worded items loading with negatively worded items), subsequent analyses involving the DMCI will generally not be broken down by factor.

4.2.2. Developmental differences

A second set of analyses assessed developmental differences pertaining to the DMCI and adolescents' importance ratings of social–relational goals. With respect to decision-making competency, it was found that whereas the eleventh graders scored higher than the ninth graders on the total DMCI score, this difference was not significant ($P > .10$). Additional analyses revealed no significant main or interaction effects for race or father's education level. However, there was a significant interaction between grade and mother's education level, $F(1,390) = 4.46$, $P < .05$. Whereas the DMCI scores of the ninth graders did not differ by mother's education level, eleventh graders whose mothers were college graduates had significantly higher scores ($M = 76.30$, S.D. $= 11.48$) than those whose mothers had less education ($M = 72.18$, S.D. $= 9.96$).

In regard to SOCIAL-IMPORT scores, it was found that the ninth graders rated social–relational goals as more important than the eleventh graders (ninth graders: M rating $= 22.38$,

S.D. = 4.41; eleventh graders: *M* rating = 20.83, S.D. = 4.25), *t*(404) = 3.58, *P* < .001. Additional analyses revealed no significant main or interaction effects for parents' education level. However, there was a significant interaction between grade and race, *F*(1,366) = 5.46, *P* < .05. Whereas the SOCIAL-IMPORT scores of the ninth graders did not differ by race, social–relational goals were rated as more important by eleventh-grade White adolescents (*M* = 21.74, S.D. = 4.22) than by eleventh graders from non-Asian minority populations (*M* = 19.58, S.D. = 4.26).

In an attempt to substantiate the above findings, further analyses were performed to assess developmental differences in the social behaviors reported by the participants. A one-way MANOVA using the WAI Restraint scale as the multivariate dependent variable again found a significant difference between the two grades, *F*(4,399) = 6.32, *P* < .001. However, this difference was only significant for the Responsibility subscale, *F*(1,402) = 16.22, *P* < .001, with the ninth graders reporting their behavior as more responsible than the eleventh graders. Additional analyses revealed no significant main or interaction effects for parents' education level. However, there was a significant race effect for the Suppression of Aggression and Impulse Control subscales (both *P* < .05), with non-Asian minority adolescents indicating less suppression of aggression but more impulse control than White adolescents.

Collectively, these findings could be summarized by saying that whereas there was no evidence of a developmental difference in the decision-making competency of ninth- and eleventh-grade boys, as assessed through the DMCI, ninth-grade boys appeared to be more affirming of socially competent behavior compared to eleventh-grade boys. Whereas having a highly educated mother was associated with higher scores on the assessment of decision-making competency, and race (i.e., being White) was generally associated with a greater affirmation of social–relational goals, these findings were limited to the eleventh graders.

4.2.3. Relationship between goals and behavior

A third set of analyses examined the relationship between what adolescents said was important to them from a social–relational standpoint and their reported social behaviors. As hypothesized, it was found that adolescents' SOCIAL-IMPORT scores positively correlated at both grades with their scores on the Restraint scale of the WAI (see Table 2). Thus, adolescents who reported that social–relational goals were important to them also tended to report increased engagement in socially competent behaviors.

4.2.4. Predicting social behavior

A fourth set of analyses assessed whether adolescents' valuing of social–relational goals and their decision-making competency were both unique predictors of their self-reported social behaviors, even after controlling for potentially confounding variables. Here, a simultaneous regression analysis was performed whereby the following seven variables were entered as predictors of participants' WAI scores: race, grade, GPA, mother's highest level of education, father's highest level of education, total DMCI score, and SOCIAL-IMPORT score. It was decided that the composite score of the WAI Restraint scale would be used as the one dependent variable (rather than treating the subscales separately) because collectively the subscales were chosen to provide an adequate sense of adolescents' social behaviors.

Moreover, whereas the internal consistency of individual subscales is questionable, that of the scales combined (Cronbach's α=.91) suggests an underlying unidimensional construct. As hypothesized, two unique, significant predictors emerged: SOCIAL-IMPORT score (β=.59, $P < .001$) and DMCI score (β=.35, $P < .001$). These two variables together explained 56% of the variance in WAI scores. These findings suggest that adolescents who reported that social–relational goals were important to them and who were assessed with a high level of decision-making competency (two key components of the SRMDM) tended to report increased engagement in socially competent behavior.

4.3. Discussion

The present findings provide support for the SRMDM by suggesting that effective decision making is a function of two major factors: (a) placing importance on adaptive goals, and (b) a tendency to engage in decisional processes that facilitate the acquisition of these goals. Specifically, whereas adolescent boys' valuing of social–relational goals predicted their social behaviors, their tendency to engage in specific self-regulatory processes was a significant predictor over and beyond that (controlling for grade, race, and parent education). Hence, these self-regulatory competencies in decision making may well be a facilitating bridge between goals and behavior.

These preliminary findings also suggest that the DMCI may serve as a reliable and valid measure of some key aspects of adolescents' decision-making skill. It was found that the DMCI was moderately correlated with an established measure that indexes adolescents' self-reported social behaviors. Although the data from the DMCI were found to not fit very well with the hypothesized three-factor model, the findings suggest, nonetheless, that the construct of decision-making competency as conceptualized from the SRMDM seems to be composed of metacognitive, motivational, and behavioral aspects (that tend to co-occur in the same individuals). Given the fact that using 20 of the original 30 items optimized the reliability and validity of the DMCI, it appears that some components of decision-making competency are better predictors of adolescents' choices than others. However, in light of the study's limitations concerning sample (e.g., all boys) and methodology (e.g., all self-report), we thought it was important to conduct additional studies before drawing firmer conclusions regarding the composition and usefulness of the DMCI (see Study 2).

From a developmental standpoint, we found that the DMCI scores of the ninth- and the eleventh-grade boys did not differ. Although there is a body of literature suggesting possible developmental differences favoring the older adolescents (see Miller, 2000), the present results are consistent with other studies that have revealed negligible developmental differences (e.g., Byrnes & McClenny, 1994; Jacobs & Potenza, 1991). In regard to adolescents' valuing of social–relational goals, it was found that younger boys expressed a greater valuing of socially competent behavior than did older boys. Related to this and consistent with findings pertaining to the self-reported onset and prevalence rates of serious violent offenses (see Coie & Dodge, 1998), it was also found that older boys reported engaging in more delinquent, rule-violating behaviors than younger boys. Although differences by race and SES were not a focus of this investigation, future research might further explore why

differences in self-regulatory processes by race and mother's education level generally appeared only among older adolescent boys.

5. Study 2

A second study was conducted with the primary goals of replicating and extending the results from Study 1. To accomplish this, an additional method to assess social behavior (i.e., peer ratings) was incorporated. Also, a more diverse sample (i.e., boys and girls from multiple schools) was used to allow for greater generalizability of the findings

5.1. Method

5.1.1. Participants

Data were collected from a total of 297 participants coming from three co-educational high schools in the Baltimore–Washington area. Thirty-six of the participants were from a public school and the remainder was from two parochial schools. There were 189 participants from the ninth grade, 18 from the tenth grade, 71 from the eleventh grade, and 19 from the twelfth grade. The sample was diverse in terms of sex (i.e., 48% male, 52% female) and race (i.e., 48% White, 35% Black, 6% Asian or Pacific Islander, 4% Hispanic, 2% American Indian, and 5% other).

5.1.2. Measures

5.1.2.1. Social behavior. Similar to what has been done in prior studies (e.g., Wentzel, 1991), a peer-nomination form was utilized in which participants respond to the following four questions: (a) ''Who is considerate of others?'' (b) ''Who can be counted on to do what is right?'' (c) ''Who takes time to think things through before acting?'' and (d) ''Who keeps their cool and avoids fighting?'' The content of these four items was chosen to be consistent with items from the four WAI subscales (Consideration of Others, Responsibility, Impulse Control, and Suppression of Aggression, respectively). Participants were divided into groups of about 10–15 peers, generally by homeroom class. Due to low levels of participation in some classes, however, some groups were composed of same-grade peers from more than one class. For each question, participants are presented with the same listing of the 10–15 peers in their group. They are asked to circle the names of students (other than themselves) who they feel fit the behavior described, nominating as many or as few people as they wish. They are also told to cross out the names of those students who they do not know well enough to make a judgment.

The peer-nomination forms were scored by taking the total number of nominations received on the four questions and dividing this by the result obtained in taking the total number of times the name appeared on nominations lists minus the total number of times the name was crossed off. This was then multiplied by 100 to eradicate decimals. Since the results were generally found to be normally distributed, no further transformations were done.

When separate scores were computed for the four items in the manner described, Cronbach's α for the four-item measure was .91.

5.1.2.2. Measures from Study 1. As in the previous study, the following measures were also utilized in the current study: the 30-item DMCI, the Restraint scale of the WAI, the importance assessment of social–relational goals, and measures of achievement valuing and behavior (results not reported here).

5.1.3. Procedure

All 297 participants were administered a task booklet containing the DMCI and the importance assessment of social–relational goals. As was done in the previous study, all participants were asked to report certain demographic information (i.e., sex, race, grade, etc.). In addition, 170 of the participants (96 boys, 74 girls; 91 ninth graders, 18 tenth graders, 42 eleventh graders, 19 twelfth graders) completed the Restraint scale of the WAI as well as an importance assessment of academic goals and a measure of achievement behavior (the results from these latter two measures reported in Miller, 2000). These participants were from the public school and one of the two parochial schools. At one of the parochial schools, peer-nomination forms were completed by all 127 of the participants (48 boys, 79 girls; 98 ninth graders, 29 eleventh graders).

Administration of all measures was carried out either during homeroom or a regular class period. When multiple measures were given, three versions of the task booklet were made (i.e., each with a different ordering of the measures) to control for order effects.

5.2. Results

Similar to the previous study, the results are presented as follows: First, the reliability and validity of the DMCI are assessed. Second, developmental and gender differences with respect to the DMCI and adolescents' importance ratings of social–relational goals (SOCIAL-IMPORT scores) are evaluated. Third, the relationship between what adolescents say is important to them from a social–relational standpoint and their social behaviors is examined. Fourth, it is assessed whether adolescents' valuing of social–relational goals and their decision-making competency are both unique predictors of their social behaviors as indexed by the WAI and peer nominations.

5.2.1. Psychometric properties of the DMCI

The concurrent validity of the DMCI was assessed by seeing how strongly the measure correlated with two measures indexing adolescents' social behaviors. The 20-item version of the DMCI was again found to have better properties than the 30-item version (Cronbach's α=.87 for both versions), so the results for the former are reported here. First, it was found that, consistent with Study 1, scores on the DMCI were positively correlated with scores on the Restraint scale of the WAI (see Table 3). Second, it was found that the DMCI was not significantly correlated with the peer nominations regarding classmates who are likely to be considerate, do the right things, think things through, and keep their cool (r=.07, P>.10).

Table 3
Study 2: correlations by sex between the 20-item DMCI , the WAI, and SOCIAL-IMPORT scores

WAI subscales	Males	Females
Correlations between the DMCI and the WAI		
Suppression of Aggression	.44***	.39**
Impulse Control	.62***	.61***
Consideration of Others	.42***	.49***
Responsibility	.61***	.55***
WAI combined subscales	.65***	.62***
Correlations between SOCIAL-IMPORT scores and the WAI		
Suppression of Aggression	.72***	.72***
Impulse Control	.37***	.53***
Consideration of Others	.66***	.78***
Responsibility	.61***	.57***
WAI combined subscales	.72***	.79***

"DMCI" stands for Decision-Making-Competency Inventory; "WAI" stands for the Restraint scale of the Weinberger Adjustment Inventory; "SOCIAL-IMPORT" stands for importance assessment of social-relational goals.

** $P < .01$.

*** $P < .001$.

However, further analyses revealed that Factor 1 (Informed Awareness) of the DMCI was significantly correlated with the peer nominations ($r = .23$, $P < .01$), with the strength of this relationship varying by gender. Specifically, the peer nominations were significantly correlated with Factor 1 of the DMCI for the boys ($r = .34$, $P = .01$), but not the girls ($r = .12$, $P > .10$). Taken together, these findings lend some support to the hypothesis that adolescents assessed with a higher level of self-regulated decision making will engage in more socially competent behavior than those assessed with a lower level of self-regulated decision making.

5.2.2. Developmental and gender differences

A second set of analyses looked at developmental and gender differences in regards to the DMCI and adolescents' importance ratings of social–relational goals. Inasmuch as there was a small minority of tenth- and twelfth-graders in the present sample, all developmental analyses have combined the tenth graders in with the ninth graders (hereafter called the younger adolescents) and the twelfth graders in with the eleventh graders (hereafter called the older adolescents). Additional analyses by race and SES were not performed since, unlike Study 1 where all participants were from the same school, participants in this study were from three schools. Thus, type of school could be confounded with these variables.

With respect to decision-making competency, recall from Study 1 that the eleventh-grade boys scored higher than the ninth-grade boys on the DMCI, but not significantly so. In the present study, a 2 (Age) × 2 (Sex) analysis of variance (ANOVA) revealed significant main effects for age, $F(1,277) = 8.06$, $P < .01$, and sex, $F(1,277) = 6.16$, $P < .05$, and a significant Age × Sex interaction, $F(1,277) = 4.53$, $P < .05$. Post hoc analysis of the Age × Sex inter-

action revealed that the DMCI score of the older girls ($M = 79.58$, S.D. $= 10.35$) was significantly higher (Scheffé, $P < .05$) than the DMCI scores of the younger boys ($M = 70.33$, S.D. $= 11.26$), the younger girls ($M = 71.83$, S.D. $= 11.80$), and the older boys ($M = 71.64$, S.D. $= 12.36$), with the latter three groups not differing among each other. Thus, whereas the prior study with all adolescent boys did not find evidence of a developmental difference in decision-making competency as measured by the DMCI, the present study found that older girls distinguished themselves from younger girls as well as younger and older boys with respect to this tendency to engage in self-regulated decision making.

In regard to SOCIAL-IMPORT scores, a 2 (Age) × 2 (Sex) ANOVA revealed a significant main effect for sex, $F(1,279) = 23.54$, $P < .001$, with the importance ratings of the girls ($M = 23.15$, S.D. $= 4.61$) higher than the importance ratings of the boys ($M = 20.54$, S.D. $= 4.93$). In an attempt to substantiate these findings, a 2 (Age) × 2 (Sex) MANOVA using the WAI Restraint scale as the multivariate dependent variable revealed a significant interaction, $F(4,149) = 2.56$, $P < .05$. At the univariate level, this interaction was significant for the Suppression of Aggression subscale, the Impulse Control subscale, and the Consideration of Others subscale (all $P < .05$). Post hoc analysis of the Age × Sex interaction using the combined score from the three aforementioned subscales revealed that the reported behavior of the older girls ($M = 78.32$, S.D. $= 10.89$) was significantly more socially competent (Tukey's honestly significant difference, $P < .05$) than that of the younger girls ($M = 65.96$, S.D. $= 14.94$), the younger boys ($M = 68.64$, S.D. $= 12.87$), and the older boys ($M = 67.42$, S.D. $= 15.37$), with the latter three groups not differing among each other. Taken together, these analyses suggest that adolescent girls — especially older ones — tend to be more affirming of socially competent behavior compared to adolescent boys.

5.2.3. Relationship between goals and behavior

A third set of analyses examined the relationship between what adolescents said was important to them from a social–relational standpoint and their apparent social behaviors. First, it was found that SOCIAL-IMPORT scores for both boys and girls positively correlated with their scores on the Restraint scale of the WAI (see Table 3). Second, it was found that SOCIAL-IMPORT scores were significantly correlated with the peer nominations ($r = .41$, $P < .001$), with the relationship significant for both the girls ($r = .37$, $P < .001$) and the boys ($r = .29$, $P < .05$). As hypothesized, these findings suggest that adolescents who are affirming of social–relational goals tend to engage in more socially competent behaviors than those less affirming of such goals.

5.2.4. Predicting social behavior

A fourth set of analyses assessed whether adolescents' valuing of social–relational goals and their decision-making competency were both unique predictors of their social behaviors, even after controlling for potentially confounding variables. Here, a simultaneous regression analysis was performed whereby the following eight variables were entered as predictors of participants' WAI scores: sex, race, grade, GPA, mother's highest level of education, father's highest level of education, total DMCI score, and SOCIAL-IMPORT score. Four unique, significant predictors emerged: SOCIAL-IMPORT score ($\beta = .62$, $P < .001$), the DMCI score

(β=.32, P < .001), race (β = − .11, P < .05), and grade (β = − .10, P < .05). These four variables together explained 66% of the variance in scores on the WAI. Consistent with Study 1, these findings suggest that adolescents who reported that social–relational goals were important to them and who were assessed with a high level of decision-making competency tended to report increased engagement in socially competent behavior. This tendency was slightly stronger for non-White students and younger adolescents.

In an attempt to corroborate the previous findings, a second simultaneous regression analysis was performed in the same manner just described except that (1) the peer nominations of social behavior were used as the dependent variable in place of the WAI scores, and (2) Factor 1 of the DMCI was used as a predictor in place of the composite DMCI score. It was found that the eight predictors together explained 38% of the variance in nomination scores, with sex (β=.30, P < .001), grade (β=.21, P < .05), GPA (β=.28, P < .01), and SOCIAL-IMPORT score (β=.21, P < .05) as the only unique, significant predictors. Thus, the best predictors of being nominated as someone who tends to be considerate, do what is right, think things through, and keep their cool were being female, being older, having a higher GPA, and being affirming of social–relational goals.

6. General discussion

Two studies were conducted to accomplish four primary aims: (1) to develop and evaluate a new measure assessing some key elements of decision-making competency, (2) to extend prior findings by assessing developmental and gender differences with respect to these self-regulatory decision processes and adolescents' valuing of social–relational goals, (3) to examine the relationship between what adolescents say is important to them from a social–relational standpoint and their apparent social behaviors, and (4) to assess whether adolescents' valuing of social–relational goals and their decision-making competency predict their social behaviors. In what follows, we interpret our results in light of these objectives and relate the findings to prior research.

As noted earlier, the DMCI was primarily constructed on the basis of the SRMDM (Byrnes, 1998). It assesses whether adolescents tend to tap into certain kinds of resources and use strategies to overcome dysregulating influences when they make important decisions. Both studies showed that the DMCI has adequate internal consistency. Moreover, scores on the DMCI correlated significantly with scores on an established and widely used measure of social competence (the WAI). Thus, one could say that the measure has reasonable concurrent validity as well. Finally, regression analyses in both studies showed that social goals and self-regulatory competencies in decision making were the best predictors of socially competent behavior. Hence, as predicted by the SRMDM, adolescents were more likely to report their engagement in socially competent behavior if they (1) considered socially competent behavior to be important to them and (2) engaged in decision processes that increase their chances of discovering appropriate ways to behave. It is noteworthy that the relationship between adolescents' decision-making competency and their reported behaviors was not accounted for by their academic ability as indexed by GPA. This finding

is encouraging from an intervention standpoint because it suggests that adolescents at all levels of academic performance are capable of learning self-regulatory competencies in decision making.

Study 2 showed that the concurrent validity findings for the DMCI were much more robust when participants self-reported on their behaviors than when their social behaviors were rated by peers. This discrepancy, however, is not very surprising given that the strength of the correlations between self- and peer ratings of social behaviors have been found to be moderate at best (i.e., *r*'s ranging from .19 to .48) (Wentzel, 1991; Wentzel et al., 1990). A factor that may partly explain why, in this particular study, the correlations were stronger with the self-report measure than with the other-report measure is that although both were constructed to index adolescents' behaviors, there could be more of a distinction between what they are measuring. That is, the other-report rating might be more accurately assessing behavioral outcomes rather than behaviors per se. If so, it would be expected that goals and self-regulatory processes would be more strongly related to behaviors than outcomes. After all, goals and self-regulatory processes precede behaviors, and behaviors precede outcomes. Moreover, behaviors and outcomes are not perfectly correlated. Consider, for example, that a self-regulated decision maker might engage in behaviors that are generally appropriate, but positive outcomes are not always obtained.

There were also some specific limitations to the present study in that there was a much smaller sample size and a greater sample bias with the use of the other-report methodology compared to the self-report portions. For example, the 127 participants who completed the peer-nomination measure represented only a 30% response rate from that school (which compares to a response rate of around 85% for the self-report portions across both studies). Another mitigating factor is a lack of familiarity among participants completing the peer-nomination forms. On average, each participant was not known well enough for judgment by more than one quarter of his/her raters (i.e., 3.6 out of an average of 12.2 raters).

But it is noteworthy that, despite the measurement limitations of the peer ratings, some significant correlations were obtained. For example, one factor of the DMCI (Informed Awareness) was significantly correlated with the peer nominations of social competence. Not surprisingly, it is this factor (i.e., being reflective in the decision-making process and gathering adequate information in order to make an informed choice) that is most in line with social information-processing models of human behavior. These models suggest that antisocial and aggressive behaviors in adolescents stem partly from biases and faulty attributions that occur during the encoding and interpreting of social cues (Crick & Dodge, 1994). It would be beneficial to employ additional studies that more closely examine how specific items or factors within the DMCI may differentially relate to adolescents' decisions across multiple life contexts.

As for developmental and gender differences, recall that Study 1 did not find evidence of a developmental difference in adolescent boys' decision-making competency. The second study, however, found that older girls scored significantly higher on the DMCI compared to boys and younger girls. It was also found that adolescent girls — especially the older ones — were more affirming of socially competent behavior compared to adolescent boys. Although there is a lack of research directly related to the former finding pertaining to

decision-making competency, the latter finding is consistent with several other studies which have found that girls are more affirming of social–relational goals than boys (Boldizar et al., 1989; Crick & Ladd, 1990; Miller & Byrnes, 1999). Furthermore, both findings may help to explain why boys become increasingly more likely than girls to engage in delinquent, aggressive, and violent acts as they advance through the childhood and adolescent years (Coie & Dodge, 1998).

One further gender difference worth noting was the finding that the peer nominations were significantly correlated with the Informed Awareness factor of the DMCI only for the boys. As suggested earlier, these results should be interpreted with caution given the small sample sizes. However, this finding is consistent with the fact that most social information-processing studies have focused on the behaviors of overtly aggressive children, a group composed primarily of boys (Crick & Dodge, 1994). Although not adequately tested, it has been hypothesized that such gender differences in social behavior stem from boys and girls having different processing patterns (Crick & Dodge, 1994). For example, whereas boys' social–behavioral responses may stem largely from the way they encode and interpret social cues (steps one and two in Crick and Dodge's model), it could be that girls' social–behavioral responses are more linked to their clarification of goals (step three in Crick and Dodge's model). The present study lends some support to this suggestion in that the correlation between the peer nominations and the importance assessment of social–relational goals was stronger for the girls than for the boys. However, the fact that being female was the strongest predictor of being rated by one's peers as socially competent (i.e., even when accounting for decision skills, GPA, and SOCIAL-IMPORT scores) suggests that there are other factors specifically related to females that contribute to socially competent outcomes.

In sum, then, the results of the present set of studies lend support to the SRMDM by generally demonstrating that being an effective, self-regulated decision maker involves placing importance on adaptive goals and being competent in the decisional processes leading to the attainment of one's goals. Whereas the former function is conceptualized as a "will" component of self-regulated decision making, the latter component is conceptualized as a "skill" aspect. Taken together, the studies suggest that older adolescent girls tend to be the *most* self-regulated in their decision making whereas older adolescent boys tend to be the *least* self-regulated. Additional research should seek to further test and try to explain the existence of this diverging developmental trajectory by gender. For instance, future studies could explore contextual factors that might contribute to such differences (e.g., different values in the peer culture tied to gender stereotypes, possible differences in parental and teacher expectations, etc.) and consider the kinds of interventions that might be appropriate for those populations that are at risk for making maladaptive choices. Studies also should attempt to rule out alternative interpretations of our results by controlling for possible gender differences in reporting biases (e.g., girls may wish to appear more prosocial) and making sure the results do not reflect alterations in student populations that occur as children advance through high school (i.e., some students drop out while others do not).

Finally, it would also be beneficial to have additional studies that employ even more heterogeneous samples (e.g., more public-school participants), that utilize observational and

other-report methodologies to assess behaviors, and that evaluate other contexts that are salient in the lives of adolescents (e.g., health and safety; academic achievement). There are problems with any kind of behavioral assessment (Vuchinich & De Baryshe, 1997), so the true meaning of gender and developmental differences in self-regulated decision making will only emerge after multiple studies have been conducted.

Acknowledgments

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