

Internalization of Biopsychosocial Values by Medical Students: A Test of Self-Determination Theory

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Two studies tested self-determination theory with 2nd-year medical students in an interviewing course. Study 1 revealed that (a) individuals with a more autonomous orientation on the General Causality Orientations Scale had higher psychosocial beliefs at the beginning of the course and reported more autonomous reasons for participating in the course, and (b) students who perceived their instructors as more autonomy-supportive became more autonomous in their learning during the 6-month course. Study 2, a 30-month longitudinal study, revealed that students who perceived their instructors as more autonomy-supportive became more autonomous in their learning, which in turn accounted for a significant increase in both perceived competence and psychosocial beliefs over the 20-week period of the course, more autonomy support when interviewing a simulated patient 6 months later, and stronger psychosocial beliefs 2 years later.

Within the medical profession, there has been an increasingly strong emphasis on the technical—biological and pharmacological—aspects of health care. Critics have argued, however, that this strengthening of the biomedical orientation has been accompanied by a dehumanization of patient care (Becker, Geer, Hughes, & Strauss, 1966), and a small cadre of health care professionals has called for the adoption of a more humanistic, biopsychosocial approach to medicine (Eisenberg, 1988; Lipkin, 1989).

The biopsychosocial model (Engel, 1977) highlights the role of psychological and social factors (as well as the technical, biological and pharmacological ones) in determining patients' health and reactions to medical treatments. It also emphasizes the importance of providers' being aware of their own feelings and reactions to patients and recognizing how these factors affect the quality of health care delivery.

Among the crucial implications of the biopsychosocial approach is that interpersonal interactions between physicians

and patients can influence the patients' health status, in part by influencing their willingness to adopt the treatment recommendations made by their physicians (Cohen-Cole, 1991; Engel, 1987; Schwartz, 1982). Accordingly, the biopsychosocial approach stresses the importance of providers' being empathic (Cohen-Cole, 1991), patient-centered (Rogers, 1951), and sensitive to patients' psychological and social needs (Novack, 1987) in order to provide high-quality patient care and facilitate patients' behaving in healthful ways.

The concept of *autonomy support* contained within self-determination theory (Deci & Ryan, 1985b; Williams, Deci, & Ryan, 1995) describes a person in an authority role (e.g., a health care provider) taking the other's (e.g., the patient's) perspective, acknowledging the other's feelings and perceptions, providing the other with information and choice, and minimizing the use of pressure and control. Thus, autonomy support instantiates the type of provider behavior that is widely advocated by adherents to the biopsychosocial approach to medicine.

Recent evidence showing that providers' behaving in an autonomy-supportive manner has positive effects on patients' health-promoting behaviors and health status (e.g., Kaplan, Greenfield, & Ware, 1989; Williams, Grow, Freedman, Ryan, & Deci, 1996) thus constitutes empirical support for the biopsychosocial model. For example, the study by Williams et al. (1996) revealed that when health care providers in a medically supervised weight-loss program were perceived as more autonomy supportive, the patients attended the program more regularly and evidenced greater maintained weight loss over a 23-month period.

In another study, Williams, Rodin, Ryan, Grolnick, and Deci (1995) linked patients' perceptions of their physicians' being autonomy supportive to greater adherence to medical prescriptions, and in still other studies positive associations have been

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found between providers' being autonomy supportive and patients' being more successful in programs for alcohol treatment (Bien, Miller, & Tonigan, 1993) and smoking cessation (Curry, Wagner, & Grothaus, 1991).

Because there is indication that the consequences are more positive when health care providers are autonomy supportive or patient-centered (which is implicit in the biopsychosocial approach to medicine) rather than physician-centered and focused on the exchange of technical information (which is implicit in the biomedical approach), an understanding of the conditions and processes that promote a biopsychosocial orientation and autonomy-supportive behavior among physicians could be highly important. The current studies applied self-determination theory (Deci & Ryan, 1985b, 1991) in an exploration of medical students' adoption of psychosocial values and an autonomy-supportive treatment style.

Internalization and Behavioral Regulation

Self-determination theory posits that the regulation of behavior varies in the extent to which it is controlled versus autonomous. *Controlled* behavior has an external perceived locus of causality (Deci & Ryan, 1985b; deCharms, 1968; Heider, 1958) and is experienced as pressured by demands and contingencies. *Autonomous* behavior, in contrast, has an internal perceived locus of causality and is experienced as chosen and volitional.

Internalization is the process through which external regulations are transformed into internal regulations (Ryan, 1993; Schafer, 1968). It is thus the means through which initially controlled behaviors can become autonomous. Self-determination theory assumes that humans have an innate tendency to actively engage their social surrounds and in so doing to internalize regulatory processes. However, the theory further assumes that internalization can be either less or more effective, so it distinguishes between two differentially effective types of internalization: introjection and integration.

Introjection can be thought of as partial internalization, in which external regulatory processes are taken in by an individual but not accepted as his or her own. Instead, these introjected regulations pressure and coerce the person to behave and are buttressed by threatened internal sanctions (e.g., guilt or shame) or promised internal rewards (e.g., self-aggrandizement). Introjection is the relatively ineffective type of internalization because it involves regulations' becoming part of the person but not part of what Deci and Ryan (1991) referred to as "the integrated self."

Integration, in contrast, refers to complete internalization, in which people identify with the importance of a behavior and reciprocally assimilate that identification with other aspects of their coherent sense of self. Integration, which is the optimal form of internalization, is necessary for controlled behaviors to become autonomous. Through integration, initially external regulations are brought into harmony with the self and are thus experienced as one's own. When regulatory processes have been integrated, people experience less internal conflict, accept responsibility for regulating the relevant behaviors, and behave more volitionally.

The concept of controlled behaviors encompasses behaviors that are pressured either by external contingencies or by contingencies that have been only introjected. Autonomous behaviors,

in contrast, are ones that result when a regulation has been fully integrated. Thus, to the extent that the process of internalization has been effective with respect to the regulation of behavior, people will become relatively autonomous, whereas to the extent it has been ineffective, people will remain relatively controlled.

The process of internalization is relevant not only to behavioral regulations but also to values, attitudes, and other learning contents. Self-determination theory proposes that, to the extent that people autonomously engage their environment, they will tend to internalize and integrate the values and other learning contents they encounter within that environment. Thus, as individuals integrate the regulation of their learning, they will become more autonomous in that learning and should therefore be more likely to integrate the values and knowledge in the learning context.

In the present studies, interviewing courses for second-year medical students at two universities provided the setting for exploring the process of students' becoming more autonomous in their learning and the consequences of their doing so. Using self-determination theory, we predicted that, in contexts where psychosocial values are being taught, students who become more autonomous in their learning about psychosocially oriented interviewing will (a) display greater internalization of the psychosocial values, (b) engage in subsequent interviewing behavior that is consistent with the internalized values (i.e., that is more autonomy supportive), and (c) perceive themselves to be more competent at interviewing.

Ryan and Connell (1989) used self-determination theory to develop a domain-specific strategy for assessing the extent to which regulatory styles are controlled versus autonomous. The resulting set of Self-Regulation Questionnaires (SRQ) ask individuals why they engage in particular behaviors, and each provides a set of reasons that vary in the extent to which they are controlled versus autonomous. This approach has been used in a variety of domains, such as education (Grolnick & Ryan, 1987), treatment programs (Ryan, Plant, & O'Malley, 1995), religious behaviors (Ryan, Rigby, & King, 1993), interpersonal relationships (Blais, Sabourin, Boucher, & Vallerand, 1990), and health behavior change (Williams et al., 1996). The assessment approach was developed using a simplex-like pattern (Guttman, 1954) so that the controlled and autonomous subscales could be combined to form a summary score called the *relative autonomy index* (RAI).

Higher (i.e., more autonomous) scores on the RAI in the academic domain have been shown to predict students' conceptual learning (Grolnick & Ryan, 1987), teacher ratings of student competence (Grolnick, Ryan, & Deci, 1991), and students' enjoyment of school and proactive coping with failures (Grolnick & Ryan, 1989). In the health care domain, patients' RAI predicted remaining in alcohol treatment (Ryan et al., 1995), maintaining weight loss (Williams et al., 1996), and adhering to medication prescriptions (Williams, Rodin, et al., 1995).

In summary, these and other studies in classrooms and clinics, using versions of the SRQ, have demonstrated that the relative autonomy of one's behavioral regulation is associated with a range of positive learning and behavioral outcomes. These findings are all consistent with our hypothesis that, as medical students become more autonomous in their learning about psychosocial interviewing, they will display greater internalization of the psychosocial

values and subsequent behavior that is more congruent with those values.

The Social Context of Internalization

Self-determination theory proposes that the contextual variable of autonomy support facilitates internalization and integration of regulations and values. Autonomy support involves encouraging others to be self-initiating rather than pressuring them to behave, so it allows those others to become more autonomous in the way they engage the task of learning. As such, it facilitates a fuller internalization of the material being learned.

Previous research has demonstrated that autonomy-supportive interpersonal contexts do facilitate internalization and integration (e.g., Deci, Eghrari, Patrick, & Leone, 1994). Thus, in educational settings, students who experience autonomy support have been found to be more autonomous in learning and to integrate the material being taught (e.g., Grolnick & Ryan, 1987, 1989).

Applying this perspective to medical education suggests that when medical students learn about interviewing patients from autonomy-supportive instructors, they will become more autonomous in the regulation of that learning and will in turn be more likely to adopt the values espoused by their instructors. This integration of values is theorized to occur in autonomy-supportive contexts because such contexts encourage more autonomous learning. The relationship is thus theorized to be mediational. Accordingly, we hypothesize that, if the learning climate for the second-year medical students in a biopsychosocially oriented interviewing course is autonomy supportive, the students will become more autonomous in their learning, which in turn will lead them to become more biopsychosocially oriented, behave toward their patients in more autonomy-supportive ways, and perceive themselves to be more competent at interviewing.

Although being autonomously self-regulating of domain-specific behaviors is theorized to be facilitated by autonomy-supportive interpersonal contexts, we suggest that individual differences in people's general orientation toward autonomy will also be positively predictive of relative autonomy in domain-specific behaviors (in this case, learning about medical interviewing).

Causality Orientations

The General Causality Orientations Scale (Deci & Ryan, 1985a) has three subscales, referred to as Autonomy, Controlled, and Impersonal. The *Autonomy* orientation concerns people's tendency to orient to and be guided by autonomy-supportive information and to function in self-determined ways. This includes having greater awareness of their own motivations and feelings and experiencing a greater sense of choice in the regulation of their behavior. Previous research has shown the autonomy orientation to be positively correlated with self-esteem, ego development, self-actualization (Deci & Ryan 1985a; Vallerand, Blais, Lacouture, & Deci, 1987), and integration in personality (Koestner, Bernieri, & Zuckerman, 1992). The *Controlled* orientation, in contrast, concerns people's tendency to orient toward controlling external and introjected inputs to the regulation of behavior and thus to be more rigid in their regulation. It has been found to correlate posi-

tively with the Type-A, coronary-prone behavior pattern and public self-consciousness (Deci & Ryan, 1985a). Finally, the *Impersonal* orientation concerns people's tendency to orient toward indicators of incompetence and has been found to correlate positively with social anxiety, depression, and self-derogation (Deci & Ryan, 1985a).

The degree to which medical students are more autonomous in their general orientation toward causality was hypothesized to relate to their reporting autonomous reasons for learning about medical interviewing and also to their indicating more positive attitudes about the biopsychosocial model. The reasoning for the latter prediction is as follows: Higher levels of the general autonomy orientation are theorized to involve greater awareness of internal motivations and emotions and more flexible use of that awareness in the regulation of behavior, so people high in the general autonomy orientation should be more likely to value the biopsychosocial approach, which emphasizes the importance of providers' being aware of their own internal states and recognizing the potential impact of those internal states on patients' reactions and behaviors.

This research was conducted in the second-year interviewing course at two medical schools. The setting for Study 1 was a school that does not emphasize biopsychosocial values, whereas the setting for Study 2 was a school that does emphasize those values.

Study 1

The aims of this study were (1) to provide construct validity for the Learning Self-Regulation Questionnaire (assessing the relative autonomy of students' learning about medical interviewing) and the Learning Climate Questionnaire (assessing students' perceptions of the autonomy supportiveness of the instructors); (2) to provide an initial test of the hypotheses that (a) students who are more autonomous in their general causality orientation will have stronger psychosocial attitudes and report more autonomous reasons for taking the interviewing course, and (b) instructors who are perceived as more autonomy supportive will facilitate students' becoming more autonomous in their learning and feeling more competent at interviewing; and (3) to provide an initial exploration of the relation between perceived autonomy support and internalization of psychosocial (versus biomedical) values, in a medical school that does not emphasize psychosocial factors in medical care.

According to self-determination theory, people will be likely to internalize values that are extant in autonomy-supportive contexts. We made no hypothesis about the internalization of psychosocial values (versus biomedical values) in this study because there could be conflicting processes operative. On the one hand, the values prevalent in the school, as in most American medical schools, tend to be biomedical, which suggests that instructors who are perceived as autonomy supportive would facilitate students' internalizing the extant biomedical values. On the other hand, it is possible that those instructors who are perceived as autonomy supportive would hold biopsychosocial values (rather than the biomedical ones prevalent in the school), which would imply that they would facilitate students' internalizing psychosocial values. This latter possibility is suggested by the combination of a previously established relation between

being autonomy oriented (on the General Causality Orientations Scale) and being autonomy supportive of others (Deci & Ryan, 1985a) and our current hypothesis of a relation between being autonomy oriented and holding psychosocial values. (In Study 1 we were not able to assess instructors' psychosocial beliefs, although in Study 2 we were.)

Method

Most medical students spend the vast majority of the time during their first 2 years doing academic and laboratory work. Midway through the second year, they begin learning to interview medically ill patients. This typically represents their first experience as caregivers. During this period at the medical school that was the site for Study 1, students met with an instructor in groups of two to four, for 2 hours, twice a week, for 24 weeks. The students worked in pairs to interview and examine assigned patients and report their findings to their instructors. Each student had three to five different instructors over the 24 weeks. Therefore, their ratings of the autonomy supportiveness of their instructors (assessed with the Learning Climate Questionnaire) were done with respect to the whole experience, thus representing a subjectively averaged experience.

School 1 is a public university and does not have an explicitly stated orientation toward the biopsychosocial approach. It lists as the goal of the course teaching students to accurately acquire medical information, and the instructors are from the departments of medicine and family practice.

Participants for this study were drawn from a class of about 250 second-year students who were contacted at the initial session of the interviewing course and asked to participate. They were informed that participation was voluntary and would involve filling out two sets of questionnaires. The first set was distributed in the first class and was completed by 181 students. The second set was distributed after the final exam in May and was completed by 140 students, only 91 of whom had also completed the first set.

Measures

Physician Psychosocial Belief Scale (PPBS). The PPBS has 32 items answered on a 5-point Likert scale (Ashworth, Williamson, & Montano, 1984). Scale scores are determined by summing responses on the 32 items, with low scores representing strong psychosocial beliefs and high scores representing strong biomedical beliefs. In this study, all scores were reversed so that a high score represented strong psychosocial beliefs. Levinson and Roter (1994) have found that physicians who are more biopsychosocially oriented are more likely to be empathic and patient-centered when interviewing patients. In the present study a modified version of the scale was developed that included only 15 of the items. During the first administration (Time 1), students completed the long version of the scale, and those data were used to create the shorter version. Although this scale was initially validated with practicing physicians, it seemed reasonable to use it with students who had spent a year and a half in medical school. The current study will therefore represent a validation study of the instrument for use with medical students.

Cronbach's alpha for the 32-item scale was .86 ($n = 181$). For the shortened, 15-item scale, the Cronbach's alpha was .71. Total scores on the shortened scale were correlated very highly with scores for the full scale ($r = .92, p < .001$). On the basis of these analyses, the shortened, 15-item scale was used for the second administration (Time 2), and only the responses from the 15 items were used to form Time 1 scores.

General Causality Orientations Scale (GCOS). The GCOS consists of 12 vignettes and 36 items (Deci & Ryan, 1985a). Each vignette describes a typical social or achievement-oriented situation and is followed

by three types of responses: autonomous, controlled, and impersonal. Respondents indicate, on 7-point Likert-type scales, the extent to which each response is typical for them. Thus, the scale has an Autonomy, a Controlled, and an Impersonal subscale, and each subscale score is generated by summing the individual's responses on the 12 items corresponding to that subscale. The scores are an indicator of the strength of participants' orientations toward each of the three sources of initiation and regulation of their behavior. Because the GCOS has been well validated, the scale was used in part to provide evidence for the construct validity of the scales that were being validated in this study.

Learning Climate Questionnaire (LCQ). The LCQ was adapted from the Health-Care Climate Questionnaire (Williams et al., 1996). The scale has 15 items, with 5-point Likert-type scales, that reflect the degree to which the students perceive the instructor or instructors as supporting their autonomy. A sample item is, "My instructor tried to understand how I saw things before suggesting a new way to do something."

Students ($N = 131$) completed the scale at the end of the 24-week course. A principal-components factor analysis yielded a single factor solution (15 items, eigenvalue = 9.5) that explained 63% of the variance in the scale. All items loaded .66 or higher on the single factor. The alpha reliability of the scale was .96.

Ninety-six participants completed the GCOS at Time 1 and the LCQ at Time 2. For them, the autonomy orientation was positively correlated with perceived autonomy support ($r = .24, p < .05$), but neither the controlled nor the impersonal orientation was significantly correlated with perceived autonomy support. Age and gender were unrelated to perceived autonomy support.

Learning Self-Regulation Questionnaire (LSRQ). The LSRQ was adapted from the original self-regulation questionnaire (Ryan & Connell, 1989) and other adaptations of it (e.g., Ryan et al., 1995; Williams et al., 1996). The items were written to represent both controlled (i.e., external and introjected) and autonomous (i.e., integrated) reasons for why students participated in the interviewing course. The students responded to 13 items on 5-point Likert-type scales. Scores were calculated for each of the two subscales by summing the items on the subscale, and a total score, the RAI, can be calculated by subtracting the Controlled subscale score from the Autonomy subscale score, after converting each to a z score.

Interviewing Competence Scale (ICS). The ICS includes five items written for this study. Each item asks the students to indicate how skilled or effective they feel at interviewing. Responses are given on 5-point Likert-type scales. The items are face valid.

Internal consistency of the self-regulation (LSRQ) and competence (ICS) scales. A principal-components factor analysis was performed for the responses from 181 students using the 13 items from the LSRQ and the 5 items from the ICS. The expected three factors emerged from an oblique rotation. All items loaded on the expected factors at .40 or greater, with no cross loadings above .23. Factor 1 (7 items, eigenvalue = 4.7) represents autonomous reasons for participating in the interviewing class, whereas Factor 2 (6 items, eigenvalue = 2.6) represents controlling reasons. Factor 3 (5 items, eigenvalue = 2.2) represents the students' self-perception of competence at interviewing. Cronbach alphas for these scales were .78, .70, and .80, respectively. The factor composites of Autonomous Reasons, Controlled Reasons, and Perceived Competence will typically be followed by an indicator such as Time 1 (or T1) to indicate the point in the study at which the data were obtained.

Construct validity of the scales. For the 181 students who completed the baseline questionnaires at T1, Autonomous Reasons was positively correlated with the Autonomy subscale of the GCOS ($r = .33, p < .001$) and with Perceived Competence ($r = .22, p < .001$). Controlled Reasons was positively correlated with the Controlled subscale of the GCOS (r

Table 1
Intercorrelations Among Time 1 (T1) Measures at School 1 ($n = 181$)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------------------------------|---|-----|--------|-------|---------|---------|---------|----------|----------|
| 1. Gender (M = 0, F = 1) | — | .06 | .21*** | -.09 | -.07 | -.02 | .09 | .00 | .19*** |
| 2. Age (years) | | — | .01 | .02 | -.14** | .19*** | .03 | -.04 | .01 |
| 3. Autonomy orientation | | | — | .19** | -.04 | .24*** | .33**** | .04 | .25**** |
| 4. Controlled orientation | | | | — | .51**** | .11 | .17** | .27**** | -.14** |
| 5. Impersonal orientation | | | | | — | -.22*** | .01 | -.45**** | -.27**** |
| 6. Perceived competence (T1) | | | | | | — | .22*** | -.13* | .20*** |
| 7. Autonomous reasons (T1) | | | | | | | — | .00 | .17** |
| 8. Controlled reasons (T1) | | | | | | | | — | -.14** |
| 9. Psychosocial beliefs (T1) | | | | | | | | | — |

Note. Cronbach's alpha for scales constructed for this study appear in parentheses on the diagonal.

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

= .27, $p < .001$) and with the Impersonal subscale ($r = .45$, $p < .001$). These relations were all in the expected direction.

When the Autonomous Reasons and Controlled Reasons subscales were combined into the RAI—a procedure that has been used in several previous studies (e.g., Blais et al., 1990; Grolnick & Ryan, 1987; Ryan & Connell, 1989)—the resulting variable RAI (T1) correlated positively with the Autonomy subscale of the GCOS ($r = .18$, $p < .01$) and negatively with the Impersonal subscale ($r = -.35$, $p < .001$). These relations were as expected.

Perceived Competence at T1 was positively correlated with the Autonomy subscale of the GCOS ($r = .24$, $p < .001$), RAI at T1 ($r = .24$, $p < .001$), and age ($r = .19$, $p < .01$), and negatively correlated with the Impersonal subscale ($r = -.22$, $p < .001$). Each of these relations was in the expected direction.

Taken together, the preliminary analyses provide evidence of good internal consistency, as well as construct validity, for the LCQ, the LSRQ, and the ICS.

Results and Discussion

Relations Among Variables at T1

Table 1 presents the correlations among the variables at the Time 1 data collection for 181 students. Several of these correlations provided construct validity for the new or adapted scales, as reported in the *Measures* section.

The hypothesis that students who are more self-determined (as reflected in high scores on the Autonomy subscale of the GCOS) would have stronger psychosocial beliefs was supported by a significant correlation between the two variables ($r = .25$, $p < .01$). Significant negative correlations between psychosocial beliefs and the non-self-determined orientations (Controlled, $r = -.14$, $p < .05$; Impersonal, $r = -.27$, $p < .001$) provide further support for the hypothesis. Simultaneous regression of psychosocial beliefs (T1) onto the three orientations from the GCOS revealed that, when controlling for gender, only the Autonomy ($B = .23$, $p < .001$) and Impersonal ($B = -.22$, $p < .01$) subscales accounted for significant variance.

Students scoring high on the Autonomy subscale of the GCOS were also more autonomous in their reasons for participating in the course ($r = .33$, $p < .001$) and perceived themselves to be more competent at interviewing ($r = .24$, $p < .01$). Table 1 also reveals that women tended to be more autonomous in their orientation on the GCOS ($r = .21$, $p < .01$) and to have

a stronger belief in the psychosocial approach ($r = .19$, $p < .01$). Older students were less impersonal ($r = -.14$, $p < .05$) and perceived themselves to be more competent ($r = .19$, $p < .01$).

To summarize, students' being more self-determined (as reflected primarily in high scores on the Autonomy subscale of the GCOS and secondarily by low scores on the Controlled and Impersonal subscales) was associated with the students' psychosocial beliefs, domain-specific relative autonomy, and perceived competence at interviewing (all at T1), as predicted.

Facilitating Internalization of Regulations and Values

Table 2 presents the means and standard deviations for the variables assessed at T1 and T2, and Table 3 presents the correlations among the variables relevant to testing the hypotheses about internalization.

We hypothesized that autonomy-supportive learning climates would facilitate students' becoming more autonomous in their learning and feeling more competent at interviewing. To test this, we regressed each dependent variable at Time 2 (T2) onto the corresponding T1 variable in the first step (to form the change residuals) and then onto perceived autonomy support in the second step. If age or gender was significantly correlated with the dependent variable, it was entered in the second step, and perceived autonomy support was entered in the third step.

Table 2
Means and Standard Deviations of Time 1 and Time 2 Measures at School 1

| Variable | Time 1 | | Time 2 | |
|------------------------|----------|-----------|----------|-----------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> |
| Autonomy orientation | 72.13 | 6.59 | — | — |
| Controlled orientation | 50.20 | 7.79 | — | — |
| Impersonal orientation | 37.17 | 8.99 | — | — |
| Relative autonomy | -0.08 | 1.28 | -0.18 | 1.39 |
| Perceived competence | 22.53 | 2.24 | 22.24 | 2.61 |
| Psychosocial beliefs | 59.30 | 6.44 | 57.38 | 7.44 |
| Age | 24.76 | 3.13 | — | — |
| Gender (M = 0, F = 1) | 0.42 | 0.50 | — | — |
| Total autonomy support | — | — | 130.10 | 17.13 |

Table 3

Correlations Among Time 1 (T1) and Time 2 (T2) Measures at School 1 (n = 91)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|-------------------------------|---|-----|-------|-------|-------|---------|---------|---------|---------|---------|---------|
| 1. Gender (M = 0, F = 1) | — | .04 | .06 | .22** | .10 | .12 | .07 | .23** | .06 | .12 | .01 |
| 2. Age (years) | | — | .21** | .05 | -.16 | .03 | -.02 | .09 | -.07 | -.01 | .11 |
| 3. Perceived competence (T1) | | | — | .26** | -.18* | .25** | .38**** | .10 | .01 | .28*** | -.09 |
| 4. Autonomous reasons (T1) | | | | — | -.02 | .40**** | .14 | .38**** | -.02 | .10 | .20* |
| 5. Controlled reasons (T1) | | | | | — | -.01 | .02 | .19* | .51**** | .18* | .22** |
| 6. Psychosocial Beliefs (T1) | | | | | | — | .24** | .28*** | -.09 | .50**** | .21** |
| 7. Perceived competence (T2) | | | | | | | — | .37**** | -.07 | .30*** | .28*** |
| 8. Autonomous reasons (T2) | | | | | | | | — | .09 | .25** | .42**** |
| 9. Controlled reasons (T2) | | | | | | | | | — | -.18* | -.14 |
| 10. Psychosocial Beliefs (T2) | | | | | | | | | | — | .11 |
| 11. Autonomy Support | | | | | | | | | | | (.96) |

Note. Cronbach alpha for autonomy support appears in parentheses on the diagonal.

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

If age or gender remained significantly predictive of the dependent variable, it was retained in the analysis, otherwise it was dropped. This analytic strategy was followed for each of the analyses.

When the RAI at T2 was regressed onto RAI at T1 ($B = .37$, $p < .001$) and autonomy support ($B = .45$, $p < .001$), the total model was significant: $F(2, 88) = 20.43$, $p < .001$. Autonomy support accounted for 20% of the variance in the RAI residual, $\Delta F(1, 88) = 25.6$, $p < .001$, thus supporting the hypothesis that perceived autonomy support of the instructors would lead students to become more autonomously self-regulating in their course participation.

When perceived competence (T2) was regressed onto perceived competence (T1; $B = .59$, $p < .001$) and autonomy support ($B = .41$, $p < .001$), the model was also significant, $F(2, 88) = 14.04$, $p < .001$. Therefore, perceived competence increased in the context of an autonomy-supportive learning environment. Hierarchical multiple regression was then used to test whether change in relative autonomy mediated the relationship between autonomy support and change in perceived competence. Perceived competence (T2) was regressed onto perceived competence (T1; $B = .42$, $p < .001$), autonomy support ($B = .32$, $p < .001$), and RAI (T1; $B = -.05$, ns), $F(3, 87) = 9.35$, $p < .001$. Then relative autonomy (RAI, T2) was entered ($B = .29$, $p < .01$), $\Delta F(1, 86) = 6.93$, $p < .01$, which rendered autonomy support only marginally significant ($B = .19$, $p < .10$). Thus, change in relative autonomy did mediate the relationship between autonomy support and change in perceived competence.

We then explored the relation of psychosocial beliefs to the other variables, although we had not made a specific hypothesis. As can be seen in Table 2, the average of the students' psychosocial values declined significantly over the 6 months of the study, $t(90) = 2.67$, $p < .01$. This is to be expected given that, in general, the school emphasized the biomedical rather than biopsychosocial approach. However, our interest was not so much in the mean change in psychosocial beliefs as in predicting which students would become more psychosocially oriented and which would become less so.

Psychosocial beliefs at Time 2 was not correlated with autonomy support but was correlated with RAI (T2). Therefore, we analyzed to determine whether there might be an indirect

(rather than direct) relationship between autonomy support and change in psychosocial beliefs, through change in relative autonomy. First, we regressed psychosocial beliefs (T2) onto psychosocial beliefs (T1) and RAI (T1), and then onto RAI (T2) in a second step. This analysis yielded a beta of .19 ($p < .10$) and a $\Delta F(1, 87)$ of 3.67 ($p < .10$), thus indicating that change in psychosocial beliefs was marginally related to change in relative autonomy, which we had already found to be related to autonomy support.

To summarize, autonomy support accounted for significant changes in the students' relative autonomy and perceived competence during the interviewing course, and this change in perceived competence as a function of autonomy support was found to be mediated by change in relative autonomy. Further, change in relative autonomy was marginally related to change in psychosocial beliefs, thus suggesting that autonomy support affected the latter variable indirectly.

The results from this study not only provide construct validity for the newly developed or modified measures but also provide initial support for the general hypothesis that an autonomy-supportive learning climate in an interviewing course facilitates students' becoming more autonomous and feeling more competent. There was also weak indication that an autonomy-supportive learning climate may lead medical students to adopt a more psychosocial orientation even in a school that evidences a biomedical orientation. If there is a relationship between perceived autonomy support and internalization of psychosocial values (which the data suggest there may be), it is presumably because autonomy-supportive instructors also espouse a biopsychosocial approach (even when the biomedical approach is more prevalent in the school).

The second study was undertaken to replicate and extend the findings from the first, to test the hypothesis that an autonomy-supportive learning climate that espouses the biopsychosocial approach will facilitate internalization of psychosocial values (as mediated by the students' being autonomous in their learning), and to determine whether, as we expected from the results of Study 1, the instructors who are perceived by their students as more autonomy supportive also tend to hold stronger psychosocial values. The school used for Study 2 explicitly endorses a biopsychosocial approach to medicine.

Study 2

In this study we not only examined the relation of the autonomy supportiveness of the learning climate to internalization of regulations and values, but we also related the variables assessed during the course to (a) actual interview behaviors displayed 6 months later and (b) psychosocial values assessed 2 years after the close of the course, when the students had had substantial experience on their clinical rotations.

Method

Students at a second medical school (School 2) were contacted in December of their second year before they began their 20-week interviewing class and were asked to participate in the study. They were informed that participation would involve filling out three sets of questionnaires during their interviewing course and a fourth questionnaire at the end of their fourth year. They were later asked for permission to be audiotaped while interviewing a simulated patient during their third year. The course involved two consecutive 10-week sessions, with a separate instructor for each half. Using three sets of questionnaires during the course (rather than just two, as in Study 1) allowed us to obtain the students' assessment of the autonomy supportiveness of each of their two instructors. There were 98 students in the class, of whom 72 completed the T1 (beginning of the course) and Time 3 (T3; end of the course) questionnaires. Only 58 of the 72 students were audiorecorded interviewing the standardized patient at Time 4 (T4) because the remaining students did not take the course in which this exercise was done. Finally, 56 of the students completed the questionnaire at Time 5 (T5), approximately 2 years later. Instructors for the course were also asked to participate in the study by completing the PPBS.

Students at School 2 were given greater exposure to the biopsychosocial approach than were students at School 1. During their first year and a half, they attended occasional lectures on the approach. During the medical interviewing course, in their fourth semester, they met in groups of 11 or 12 for 2 hours a week for 10 weeks with one instructor and then for another 10 weeks with a second instructor. Goals for the course emphasized the students' learning to conduct a patient-centered interview, elicit a coherent story of the patient's experience, facilitate a helping relationship, develop a differential diagnosis, and plan a therapeutic strategy. Another expressly stated goal was that students become more aware of the relation of their own feelings and reactions to their interviewing behavior. Understanding and using the biopsychosocial approach is considered fundamental to achieving these course goals.

The instructors were from the school's departments of internal medicine and family medicine, and approximately half of them had had postresidency fellowship training in psychosocial medicine. Thus, we were able to relate perceptions of their being autonomy supportive not only to their psychosocial values (on the PPBS) but also to their fellowship training.

Students completed the same scales as used in Study 1: the GCOS at T1 only; the LSRQ and the PPBS at T1, T2, and T3; the ICS at T1 and T3; and the LCQ at T2 and T3, describing how autonomy supportive their instructor for that half of the course had been. At T2 and T3, students also reported how many of the 10 sessions during that half they attended and how many they attended enthusiastically. At T4, early in their third year, the students were audiorecorded counseling simulated patients about cardiovascular risk behaviors. These "patients" all reported that they smoked and were reluctant to quit, which of course is a high-risk behavior, so this was a critical aspect of the interview. The student interviews were subsequently rated by expert observers on the degree to which the students were autonomy supportive of the patient (i.e., were patient-centered as prescribed by the psychosocial approach), particularly with respect to the central issue of quitting

smoking. Finally, at T5, at the end of the fourth year, students completed a questionnaire that included the PPBS and LSRQ. The time frame for the study appears in Table 4.

Measures

The same scales were used in this study as in Study 1, with only one slight change. In the LSRQ at T5, the questions were changed to refer to why the students continued to learn about doctor-patient relations rather than why they took the course. This slight change was necessary because they were no longer in the course, but both questions pertained to the same general behavior, namely, learning about doctor-patient interactions. Factor analyses and Cronbach alpha analyses were performed as they had been in Study 1 for the five scales (and their subscales) that had been used in Study 1. In all cases the results were comparable to those of Study 1, so they will not be reported. Construct validity was also replicated. The few new statistics that provide additional construct validity for the scales will now be reported.

The students' perception of the autonomy supportiveness of the instructor (on the LCQ) was related to whether their instructor had had advanced training in biopsychosocial medicine ($t(76) = 2.1, p < .05$, for the first half; $t(80) = 2.7, p < .01$, for the second half, and was positively correlated with their instructors' psychosocial beliefs on the PPBS ($r = .59, p < .01$). This latter finding is also important because it helps explain the Study 1 result of a possible relation between instructors' being perceived as autonomy supportive and students' adopting a more psychosocial orientation in School 1. Students' perceptions of the autonomy supportiveness of their instructors were also positively correlated with the students' reports of enthusiastic attendance during each 10-week block ($r = .41, p < .001$; $r = .67, p < .001$, respectively) and with their reports of attendance during the second block ($r = .30, p < .01$) but not the first. Students' autonomous reasons for attending were also significantly correlated with enthusiastic attendance in each block ($r = .46, p < .001$, and $r = .45, p < .001$, respectively) and with attendance in the second block ($r = .31, p < .001$) but not the first.

Ratings of the students' interviewing style. To assess the autonomy supportiveness of the medical students in counseling their patients, trained raters used the items from the Health-Care Climate Questionnaire (HCCQ) developed by Williams et al. (1996). The questionnaire itself is used to assess patients' perceptions of the autonomy supportiveness of their health care providers and has been found to be both reliable and valid.

Use of the questionnaire by expert observers to rate physicians' autonomy supportiveness was pilot tested on 34 physicians counselling diabetic patients. Five undergraduate raters received 20 hours of training on the meaning of physician autonomy supportiveness, during which practice tapes were rated and discussed until agreement was reached. Following the training, raters completed the 15-item HCCQ for each physician, and they also completed a 6-item measure of patients' active involvement in their treatment. Using a procedure suggested by Rosenthal (1987, p. 15), we summed each judge's autonomy-support ratings on the 15 HCCQ items for each physician, calculated the alpha reliability of the summary scores across the five raters for the 34 interviews, and found it to be .92. Finally, we calculated the average of the five judges' HCCQ scores and found it to be strongly correlated with patient active involvement in treatment ($r = .74, p < .001, n = 25$). Patients' active involvement was also significantly positively correlated with an important indicator of the patients' health status.¹ Thus, analy-

¹ Patients' active involvement in treatment of their diabetes was negatively correlated with a long-term measure of glucose control, HgbA1c ($r = -.38, p < .05$). Lower HgbA1c scores indicate better health as represented by better control of blood sugar and fewer long-term complications.

Table 4
Time Frame of Measures for Study 2

| Time 1 | Time 2 | Time 3 | Time 4 | Time 5 |
|-------------------------------|---|---|--|--------------|
| GCOS | LCQ | LCQ | Recordings of students interviewing standardized patient, rated on autonomy support (i.e., patient centeredness) | |
| LSRQ PPBS ICS | LSRQ PPBS | LSRQ PPBS ICS | | LSRQ PPBS |
| Demographics (gender, age) | Attendance Instructors' psychosocial beliefs | Attendance Instructors' psychosocial beliefs (if they did not teach during the first half of course) | | |

Note. GCOS = General Causality Orientations Scale; LCQ = Learning Climate Questionnaire; LSRQ = Learning Self-Regulation Questionnaire; PPBS = Physician Psychosocial Belief Scale; ICS = Interviewing Competence Scale.

ses revealed good reliability and some evidence of validity for the use of the HCCQ items by trained raters to index the autonomy supportiveness of the health care providers.

In this study, three psychology graduate students were trained to rate autonomy supportiveness of health care providers using the same procedure as in the pilot study. These three trained observers then rated the autonomy supportiveness of the interview style of the 58 medical students as they counseled the standardized patient with respect to smoking and cardiovascular illness (at T4). A principal-components factor analysis on the data from the 58 tapes revealed a single factor (eigenvalue = 10.7), with all factor loadings greater than .68. The same procedure that was used to assess reliability in the pilot study was then used with the three raters in this study. The interrater, alpha reliability for the total HCCQ scores across the three judges on the 58 interviewers was .75.² Thus, adequate reliability was again demonstrated for the use of the HCCQ in rating the autonomy supportiveness of individuals' counseling styles.

Results and Discussion

Relations Among Variables at T1

Table 5 presents the correlations among the variables assessed at the beginning of the course. These allow for further scale validation and confirmation of the hypotheses tested in Study 1 about the correlates of psychosocial values. As the table shows, students who were more autonomy oriented had stronger psychosocial beliefs ($r = .44, p < .001$) and those who were more impersonally oriented had weaker psychosocial beliefs ($r = -.39, p < .001$), $n = 72$. In a subsequent regression analysis, it was determined that both the autonomy and impersonal orientations explained independent variance in psychosocial beliefs ($B = .35, p < .01$, and $-.29, p < .01$, respectively), $F(2, 69) = 12.45, p < .001$. The controlled orientation and the demographic variables (gender and age) were unrelated to the students' psychosocial beliefs.

Students who were more self-determined also felt more competent at interviewing. Perceived competence (T1) was correlated with the autonomy orientation ($r = .42, p < .001$) and

negatively correlated with the impersonal orientation ($r = -.46, p < .001$). Gender, age, and the controlled orientation were not significantly correlated with perceived competence (T1). Regression analyses confirmed that the autonomy and impersonal orientations explained independent variance in perceived competence ($B = .31, p < .01$, and $B = -.36, p < .001$, respectively), $F(2, 69) = 14.60, p < .001$. Because psychosocial beliefs was also correlated with perceived competence at the beginning of the course, psychosocial beliefs was entered as a second step in the regression and was found to be nonsignificant. Thus, the autonomy and impersonal motivational orientations were the proximal determinants of the students' perceived competence.

Students who were more self-determined at the beginning of the course also had more autonomous reasons for participating. Specifically, RAI (T1) was positively correlated with the autonomy orientation on the GCOS ($r = .46, p < .001$). RAI (T1) was also correlated with being female ($r = .33, p < .01$). A multiple regression was performed in which gender was found to be a significant predictor of RAI (T1) when entered in the first step ($B = .33, p < .01$), but gender became only marginally significant when the autonomy orientation was entered in the second step ($B = .21, p < .10$, for gender, and $B = .40, p < .001$, for autonomy), $F(2, 69) = 11.88, p < .001$, thus suggesting that the effect of gender on students' autonomous reasons may be mediated by their general autonomy orientation.

To summarize, students' autonomy orientation (and to a lesser degree the inverse of their impersonal orientation) were predictive of their psychosocial values at the beginning of the course, their relative autonomy for participating in the course, and their perceived competence at interviewing.

Facilitating Internalization of Regulation and Values

Correlations between T1 and T3 measures are presented in Table 6. The same regression analyses used in Study 1 to test

² The effective reliability, which is an alternative procedure for assessing the reliability among judges (Rosenthal & Rosnow, 1984, pp. 163-166), was .69, which is considered an acceptable level of agreement.

Table 5
Intercorrelations for School 2 Students at Time 1 ($n = 72$)

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----------------------------------|---------|-------|----------|--------|---------|--------|------|-----|---|
| 1. Autonomy orientation (GCOS) | — | | | | | | | | |
| 2. Controlled orientation (GCOS) | -.01 | — | | | | | | | |
| 3. Impersonal orientation (GCOS) | -.31*** | .25** | — | | | | | | |
| 4. Autonomous reasons (T1) | .64**** | .24** | -.07 | — | | | | | |
| 5. Controlled reasons (T1) | -.02 | .23** | .22* | .12 | — | | | | |
| 6. Perceived competence (T1) | .42**** | .08 | -.46**** | .17 | -.01 | — | | | |
| 7. Psychosocial beliefs (T1) | .44**** | -.04 | -.39**** | .32*** | -.30*** | .32*** | — | | |
| 8. Age | -.07 | -.06 | -.25** | -.12 | .00 | -.03 | -.15 | — | |
| 9. Gender | .29** | -.03 | -.10 | .35*** | -.10 | -.01 | .09 | .06 | — |

Note. GCOS = General Causality Orientations Scale; T1 = Time 1.

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

hypotheses about change in relative autonomy and perceived competence were again used, and in Study 2 the analyses were also applied to psychosocial beliefs to test the hypothesis that perceived autonomy support will predict an increase in psychosocial beliefs, mediated by an increase in autonomous motivation for course participation. In analyses in which autonomy support of the instructor was used as a predictor, the sum of the autonomy support of the two instructors (from the two halves of the course) was used unless otherwise indicated. It is important to note that although at School 1 students' psychosocial beliefs decreased slightly over the period of the course, at School 2 students' psychosocial values increased from 58.8 to 61.4, $t(71) = 3.71$, $p < .001$, during the course.

A primary hypothesis of the research was that students who perceived their instructors as more autonomy supportive would internalize the regulation of their participation in the course (i.e., would become more autonomous from T1 to T3). Gender was significantly related to RAI (T3; $r = .26$, $p < .05$), but it became nonsignificantly predictive of RAI (T3) once RAI (T1) was removed. Thus, the effect of gender on RAI (T3) was mediated by the students' relative autonomy at T1 suggesting that gender did not influence the change in RAI. Therefore, gender was excluded from further analyses. RAI (T3) was then regressed onto RAI (T1) in Step 1 ($B = .63$), $F(1, 70) = 45.58$, $p < .001$, and onto autonomy support in Step 2. The resulting beta of .23 for autonomy support, with $\Delta F(1, 69) = 6.33$, $p <$

.05, indicates that autonomy support did account for significant change in the students' relative autonomy over the 20 weeks of the course.

Students who perceived their preceptors as more autonomy supportive also experienced an increase in perceived competence at interviewing. Perceived competence (T3) was regressed onto perceived competence (T1; $B = .59$, $p < .001$) and then onto autonomy support. Autonomy support explained significant variance in the perceived competence (T3) residual ($B = .25$), $\Delta F(1, 69) = 7.35$, $p < .01$, thus indicating that an autonomy-supportive learning climate did enhance perceived competence for interviewing.

Mediational analyses confirmed that the increase in perceived competence from T1 to T3, as a function of instructors' autonomy support, was mediated by the change in relative autonomy over the same period. Perceived competence (T3) was regressed onto perceived competence (T1; $B = .58$, $p < .001$) and RAI (T1; $B = .07$, ns), and then autonomy support was entered in the second step ($B = .24$), $\Delta F(1, 68) = 7.03$, $p < .01$. When RAI (T3) was entered in the third step, it accounted for significant variance in the residual of perceived competence (T3; $B = .35$), $\Delta F(1, 67) = 8.40$, $p < .01$, and the variance explained by autonomy support decreased to a marginally significant level ($B = .17$, $p < .10$).

The new hypothesis to be tested was that, as students internalize the regulation of their learning (i.e., become more auto-

Table 6
Correlations Between Time 1 (T1) and Time 3 (T3) Variables for School 2 ($n = 72$)

| Variable | Integrated (T3) | Controlled (T3) | Competence (T3) | Psychosocial beliefs (T3) | Autonomy support |
|---------------------------|-----------------|-----------------|-----------------|---------------------------|------------------|
| Autonomous reasons (T1) | .58**** | .06 | .21* | .26** | .17 |
| Controlled reasons (T1) | -.08 | .66**** | .01 | -.17 | .05 |
| Perceived competence (T1) | .24** | -.10 | .59**** | .42**** | -.12 |
| Psychosocial beliefs (T1) | .39**** | -.35*** | .41**** | .63**** | .22 |
| Autonomy orientation | .40**** | -.12 | .32*** | .31*** | .33**** |
| Controlled orientation | .11 | .38*** | .06 | -.01 | -.14 |
| Impersonal orientation | .01 | .25** | -.35**** | -.30*** | -.07 |
| Autonomy support | .37**** | -.06 | .32*** | .31*** | — |

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

mously self-regulating of their learning) as a function of their instructors' autonomy supportiveness, they would also internalize the psychosocial values that were presented in that learning context.

Using hierarchical multiple regression, psychosocial beliefs (T3) was regressed onto psychosocial beliefs (T1; $B = .63, p < .001$), $F(1, 70) = 46.61, p < .001$. Autonomy support was entered in the second step ($B = .18$), $\Delta F(1, 69) = 3.70, p < .06$. Because this result was only marginal, the same analysis was performed separately using data from the first 10 weeks and then the second 10 weeks. In the first 10 weeks ($n = 75$), psychosocial beliefs (T2) was regressed onto psychosocial beliefs (T1; $B = .62, p < .001$) and then autonomy support from the first 10 weeks was entered in the second step ($B = .18$), $\Delta F(1, 72) = 4.19, p < .05$. In the second 10 weeks ($n = 72$), psychosocial beliefs (T3) was regressed onto psychosocial beliefs (T2; $B = .63, p < .001$) followed by autonomy support from the second 10 weeks in the second step ($B = .24$), $\Delta F(1, 69) = 7.45, p < .01$. Thus, the analyses indicate that the autonomy support of the instructor during each half of the course did predict change in the students' psychosocial beliefs during that half.

To ascertain whether, as hypothesized, the increase in psychosocial values prompted by autonomy support during each half of the course was mediated by the students' becoming more autonomous in their self-regulation, the mediational analyses were also performed on the two 10-week blocks separately. For the first 10 weeks, psychosocial beliefs (T2) was regressed onto psychosocial beliefs (T1) and RAI (T1; $B = .58, p < .001$, and $B = .09, ns$, respectively). RAI (T2) was then entered and accounted for significant variance in the residual of psychosocial beliefs (T2; $B = .26$), $\Delta F(1, 71) = 4.82, p < .05$. When autonomy support was entered as the third step, it was nonsignificant ($B = .12, ns$). Therefore, the change from RAI (T1) to RAI (T2) predicted the change in psychosocial beliefs, and the effects of autonomy support on increased psychosocial beliefs from Time 1 to Time 2 was mediated by the change in relative autonomy over the same period. This analysis was repeated for the second 10-week block, with similar results. In this case, when RAI (T3) was entered in the second step ($B = .48$), $\Delta F(1, 68) = 20.08, p < .001$, autonomy support was a marginally significant predictor of psychosocial beliefs (T3) in the third step ($B = .16, p < .10$). These results therefore confirmed the mediational role of students' autonomous regulation in the prediction of change in psychosocial beliefs as a function of the autonomy supportiveness of the learning climate.

To summarize, perceived autonomy support of the instructors explained significant changes in the students' relative autonomy, perceived competence, and psychosocial beliefs over the time frame of the course. Furthermore, as predicted, change in relative autonomy was found to mediate the relations between autonomy support and both perceived competence and psychosocial beliefs.

Maintained change in autonomy and psychosocial beliefs. Analyses were also conducted to determine whether long-term change in relative autonomy for learning about interviewing and doctor-patient relationships and long-term change in psychosocial beliefs over a period of 2½ years could be explained by the autonomy supportiveness of the instructors in the course.

Relative autonomy (T5) was regressed onto RAI (T1) and autonomy support for the 56 students who completed both questionnaires ($B = .31, p < .05$, and $B = .29, p < .05$, respectively), $F(2, 53) = 6.47, p < .01$. Then, to test whether the autonomy support also affected maintained change in psychosocial beliefs, psychosocial beliefs (T5) was regressed onto psychosocial beliefs (T1; $B = .29, p < .05$) and then onto autonomy support ($B = .26, p < .05$), $\Delta F(1, 53) = 4.29, p < .05$. Thus, the results of these two analyses do indicate that autonomy support during the course did predict a significant amount of variance in the maintained change both in relative autonomy for learning about interviewing and in psychosocial beliefs.

To test whether relative autonomy mediates the relation between autonomy support and long-term change in psychosocial beliefs, psychosocial beliefs (T5) was regressed onto psychosocial beliefs (T1; $B = .24, p < .10$), autonomy support ($B = .26, p < .05$), and relative autonomy (T1; $B = .11, ns$) $F(3, 52) = 4.17$, and then onto RAI (T5; $B = .35, p < .01$) $\Delta F(1, 51) = 7.11, p < .01$. Autonomy support became insignificant when RAI (T5) was added ($B = .15, ns$), thus confirming that the relation between autonomy support during the course and the long-term change in psychosocial beliefs was mediated by change in relative autonomy for learning about interviewing and doctor-patient relationships over the same period.

Students' interviewing behavior. The primary importance of holding a biopsychosocial orientation is, of course, its manifestation in physicians' behavior. Consequently, to determine whether the internalization of regulations and values promoted by an autonomy-supportive learning climate affected the medical students' behavior, their interviewing of a standardized patient 6 months after the end of the course about cardiovascular risk and the importance of stopping smoking was audiotaped and rated for autonomy support, as described in the *Method* section.

Students' autonomy-supportive behavior toward patients was significantly related to the students' autonomous self-regulation at the close of the course (RAI, T3; $r = .42, p < .001$). This relation thus completes the overall pattern in which instructors' being autonomy supportive in teaching students about doctor-patient relations leads the students to become more autonomously self-regulating, which in turn results in the students' supporting the autonomy of their patients. In fact, there was only a weak relation between the instructors' having been autonomy supportive in their teaching and the students' being autonomy supportive of the simulated patient. Specifically, students' autonomy support of the patient was correlated with the autonomy support of the students' instructors in the second half of the course ($r = .27, p < .05$) but not the first. This therefore indicates that the relation between instructors' autonomy support of students' learning and the students' autonomy support of patients' behavior is primarily indirect, requiring students to become more autonomously self-regulating in order for them in turn to support the autonomy of their patients.

The autonomy supportiveness of the students' interviewing behavior was also significantly correlated with their psychosocial beliefs at the close of the course ($r = .28, p < .05$), thus confirming that their psychosocial beliefs do relate to their behavior being patient-centered. Finally, students' being more patient-centered in

their behavior 6 months after the course was marginally positively related to their autonomy orientation (GCOS) at the beginning of the course ($r = .22, p < .10$) and was significantly negatively correlated with their controlled orientation ($r = -.28, p < .05$). In sum, the relations do indicate that students' interview style is related, as expected, to their relative autonomy, psychosocial beliefs, causality orientations, and their experience of their teachers' autonomy supportiveness.

Overall, the results of Study 2 provide strong support for the self-determination theory of internalization, and they draw clear links between the concepts of autonomy and autonomy support in the theory and the interpersonal orientation inherent in the biopsychosocial approach to medical care. Specifically, the T1 autonomy orientation and the inverse of the T1 impersonal orientation (both of which signify self-determination) correlated with the students' initial psychosocial beliefs and perceived competence at relating to patients. The students' beliefs changed as a function of the autonomy supportiveness of the learning climate, mediated by change in the students' relative autonomy. Perceived competence also changed as a function of the autonomy support of the learning climate, mediated by changes in relative autonomy. Finally, the students' interviewing style was correlated in the expected directions with their causality orientations, relative autonomy, and psychosocial beliefs, and with the autonomy supportiveness of the learning context.

General Discussion

Three major findings emerge from these two studies: (a) strong positive relations were found between medical students' self-determination (i.e., the general autonomy orientation on the GCOS) and their psychosocial beliefs, autonomous reasons for participating in the course (RAI, T1), and perceived competence at interviewing before they started the course; (b) the perceived autonomy supportiveness of the instructors was found to promote students' becoming more autonomously self-regulating in learning about interviewing and doctor-patient relationships, feeling more competent at interviewing, holding stronger psychosocial beliefs, and subsequently behaving in a more autonomy-supportive fashion with simulated patients; and (c) increases in relative autonomy mediated the relations between the instructors' autonomy support and the enhancement of the students' psychosocial values and perceived competence.

Together these findings provide strong support for the self-determination theory of internalization. More specifically, the various analyses support our view that students' psychosocial values are an interactive outcome of their own personalities (general causality orientations) and the learning climate in which they encounter the values. Furthermore, the students' relative autonomy in studying interviewing and doctor-patient relations was demonstrated to be the central variable at the interface between the students' personalities and the effects of the learning climate. Students' motivational orientations strongly predicted their relative autonomy (as well as psychosocial beliefs) at baseline, and then relative autonomy mediated the effects of the autonomy-supportive learning climate on their changes in psychosocial beliefs. These results, which were found during the period of the course and again 2 years later, suggest

not only that being autonomous promotes internalization of values but also that being autonomous (whether as a general personality orientation or as the regulatory style for learning about doctor-patient interactions) has something in common with valuing the psychosocial approach. This commonality, we have suggested, is the awareness of intrapersonal and interpersonal dynamics and of their relation to behavior and health.

A comparison of the results of Studies 1 and 2 is of interest in terms of the conditions that facilitate internalization of values. Both studies suggest that students' becoming more autonomous in their learning also led them to become more psychosocially oriented. However, the relation between the autonomy support of the instructor and the students' developing stronger psychosocial beliefs was significant only in Study 2, done at the medical school that emphasized the biopsychosocial approach. It is probable that the more autonomy-supportive instructors in School 1 (which emphasized the biomedical approach) were also more psychosocially oriented, particularly given that in School 2 the correlation between the instructors' psychosocial beliefs and the students' perceptions of the instructors' autonomy support was .59. If, as we expected, there had been a similar relation in School 1, it would have meant that the students of the autonomy-supportive instructors were exposed to the biopsychosocial approach from their instructors even though the biomedical approach was more prevalent throughout the school. (Recall that at School 1, students' average psychosocial beliefs decreased during the course.) This likely inconsistency between the values represented by the autonomy-supportive instructors and the school more generally would explain why there was only a weak relation between instructors' autonomy support and students' changes in psychosocial beliefs at School 1. At School 2, where the values of the autonomy-supportive instructors matched those of the school, there was a strong relation between instructors' autonomy support and students' internalization of psychosocial beliefs.

It is important to note that although the decrease in psychosocial beliefs at School 1 and the increase at School 2 might suggest that students are simply complying with institutional norms, the fact that internalization of the institutionally favored values at School 2 was explained by the autonomy supportiveness of the instructor and mediated by students' increases in autonomous motivation indicates that the process is more complex than just complying with norms being modeled at the institution. The lack of a clear relation in School 1 between instructors' autonomy support and internalization of values (either psychosocial or biomedical), no doubt caused by the inconsistency between the values espoused by the autonomy-supportive instructors and the school more generally, are also consistent with the more complex view of autonomy-supportive contexts promoting internalization of the values espoused within that context.

The implications of this model of internalization for medical education are that medical students who would otherwise be more biomedically oriented may develop somewhat of a more humanistic orientation in a learning environment that supports their autonomous learning about doctor-patient relations. Although this relation will be particularly strong if the broad school context espouses the biopsychosocial approach, it may nonetheless be evident even if the school evidences a more traditional biomedical approach.

Several current theories of motivation have the concept of perceived competence (i.e., efficacy) as a central variable (e.g., Bandura, 1986; Ford, 1992; Locke & Latham, 1990). According to these theories, when people perceive themselves as competent at a behavior that is instrumental to a desired outcome, they will be motivated to engage in that behavior. Among the interesting results of the two current studies are the findings that perceived competence at a behavior (here, interviewing patients) was enhanced only when the behavior was taught with an autonomy-supportive style, and also that this relation between instructors' autonomy support and increases in students' perceived competence was mediated by students' becoming more autonomously self-regulating. Furthermore, it is interesting to note that although numerous studies have established a relation between perceived competence at a behavior and motivation for that behavior (see Bandura, 1986), perceived competence does not necessarily predict qualitative aspects of the behavior. Specifically, the students' perceived competence at interviewing did not predict the autonomy supportiveness of their interviewing behavior ($r = .15, ns$). On the other hand, students' perceived autonomy did predict both their perceived competence and the autonomy supportiveness of their subsequent behavior.

An overarching goal of this research was to highlight the humanistic aspects of health care. Previous research has already demonstrated that the autonomy supportiveness of physicians' behavior in medical consultations is positively related to patients' physical and mental health outcomes (e.g., Kaplan et al., 1989; Bien et al., 1993; Williams et al., 1996). Thus, the extent to which instructors influence medical students to become more biopsychosocially oriented may have an important effect on their patients' health outcomes.

Gender was found to be correlated with several of the constructs in this study. Specifically, a pattern of positive relations was found between being female and being both more self-determined and more biopsychosocially oriented. The results of the analyses indicate that these effects were all mediated through the autonomy orientation of the GCOS. This finding of women being more self-determined than the men is actually consistent with other research showing gender differences in self-determination of adult learners (Vallerand & Bissonette, 1992).

A limitation of this study was the behavioral measure. Behavioral data were obtained from only 58 students, and the measure was taken at only one point in time, so it is not possible to tell whether students' behavior was actually changed by the learning climate (or by changes in their relative autonomy or psychosocial beliefs), and there is no way to know whether the relationships that did exist between beliefs and behavior would hold up for these students once they became residents and attending physicians. Nonetheless, research by Levinson and Roter (1994) has shown that scores on the PPBS do correlate positively with attending physicians' being more patient-centered.

Given the links that have been found among the variables in this and related studies (e.g., Williams et al., 1996), and given the centrality of students' relative autonomy in the network of findings, one can conclude that developing relative autonomy is an important process in medical education. The implications of this for medical-school curricula (if the findings replicate and generalize) are widespread. It would, for example, support a move

toward an interactive method of teaching that promotes student involvement and autonomy. It also suggests that instructors should be trained to be autonomy supportive.

In summary, these studies have confirmed the important link between students' self-determination and their psychosocial beliefs, and it has provided strong support for the self-determination theory of internalization.

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