

EMPIRICAL ARTICLE

Fostering Self-Endorsed Motivation to Change in Patients with an Eating Disorder: The Role of Perceived Autonomy Support and Psychological Need Satisfaction

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ABSTRACT

Objective: Although several studies have established the beneficial effects of self-endorsed forms of motivation for lasting therapeutic change, the way patients with an eating disorder can be encouraged to volitionally pursue change has received less attention. On the basis of Self-Determination Theory, this longitudinal study addressed the role of an autonomy-supportive environment and psychological need satisfaction in fostering self-endorsed motivation for change and subsequent weight gain.

Method: Female inpatients ($n = 84$) with mainly anorexia nervosa and bulimia nervosa filled out questionnaires at the onset of, during, and at the end of treatment regarding their perceived autonomy support from parents, staff members, and fellow patients, their psychological need satisfaction, and their reasons for undertaking change. Furthermore, the body mass index (BMI) of the patients at the onset and end of treatment was assessed by the staff. Path analyses

were used to investigate the relations between these constructs.

Results: At the start of treatment, perceived parental autonomy support related positively to self-endorsed motivation through psychological need satisfaction. Perceived staff and fellow patients autonomy support related to changes in self-endorsed motivation over the course of treatment through fostering change in psychological need satisfaction. Finally, relative increases in self-endorsed motivation related to relative increases in BMI throughout treatment in a subgroup of patients with anorexia nervosa.

Discussion: These results point to the importance of an autonomy-supportive context for facilitating self-endorsed motivation. © 2014 Wiley Periodicals, Inc.

Keywords: motivation; eating disorders; autonomy support; psychological need satisfaction; self-determination theory

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Introduction

Motivation is considered a fundamental psychological resource contributing to positive therapy outcomes.¹ Yet, patients with an eating disorder often lack motivation for treatment and change.² Indeed, most patients show at least some degree of resistance to change,³ which might explain the high rates of drop-out typically observed in this popula-

tion.⁴ Furthermore, although motivation is often depicted as a dynamic process (rather than a stable attribute) that can evolve throughout therapy,⁵ few studies have systematically examined changes in motivation in patients with an eating disorder.^{6,7} In contrast, most studies have focused on patients' motivation at the onset of therapy. For instance, inpatients with anorexia nervosa who felt less ready to change at the start of therapy were found to benefit more (i.e., increased their readiness to change more) when following a motivation-oriented intervention.⁸

Increasingly, it is emphasized that patients' motivation for change manifests through the gradual acceptance of and willingness to change.^{1,2} For instance, within self-determination theory (SDT), a macro-theory on human motivation and behavioral change, it is stated that patients not only need to need help but also need to want help.^{9,10} Patients are more likely to express a willingness to undertake change if they have come to fully endorse (i.e.,

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internalized) the personal significance of change. Past research has shown that a self-endorsed rather than a pressured pursuit of change yields manifold benefits, including better treatment adherence,¹¹ lower depressive symptomatology in patients with a depression,¹² and less eating preoccupation in a group of outpatients with bulimia-spectrum symptoms.⁵

The Personal Endorsement of Change

Various scholars in the field of patient motivation have emphasized the necessity for patients to be internally rather than externally motivated to undertake change.^{10,13} SDT is generally consistent with this claim,^{2,14} yet provides a more detailed account of different types of motives for change that fall along a continuum of increasing self-endorsement (i.e., internalization).¹⁵ Thus, the process of self-endorsement reflects the extent to which patients have come to fully accept the change, such that they are volitionally motivated to pursue change.

First, patients may undertake change to meet external pressures, including demanding expectations, threats of punishment, and criticism. As the reason for change is situated completely outside the patient, external regulation is characterized by a complete lack of acceptance (i.e., internalization) of the reason for change. A patient with an eating disorder who enters treatment as a result of parental demand displays external regulation. Patients can also pursue change to meet internal (rather than external) pressures. Such internal pressures involve the avoidance of shame, guilt, and anxiety, or the attainment of regard and esteem. This form of motivation has been labeled introjected regulation. A patient with an eating disorder who enters the clinic because otherwise she would feel guilty and thus feels as if she 'should' pursue change displays introjected regulation. Although the patient's motive for change is now internal to the person, the reason for change has not yet been fully accepted, as the change goes along with feelings of inner conflict and compulsion. A fuller form of self-endorsement is achieved when patients come to identify with the importance of change for oneself. In the case of identified regulation, a patient feels the personal relevance and necessity of change such that change is pursued more willingly. A patient with an eating disorder who enters treatment because she believes it is critical for her health concurs with the decision to change. Finally, when change is not only valuable by itself, but is perceived to be congruent with other important life values and interests a patient holds, the patient is

said to display integrated regulation. A patient who pursues change because she feels as if important goals and values in her life (e.g., intimate relationships, studies) are negatively affected by her eating disorder fully endorses the decision to change. The decision to change is anchored within other important life aspirations. Such an integrated regulation represents the fullest form of self-endorsed motivation.⁹

These different forms of motivation are said to fall along a continuum of increasing internalization or self-endorsement. The task for clinicians is to foster this process of gradual acceptance or self-endorsement during treatment. This might be especially challenging with patients with an eating disorder, as a lot of patients are ambivalent to make changes or resist change altogether.² Fostering self-endorsement of change is critical though as it has been found to relate to various beneficial therapy outcomes, including satisfaction with therapy and the importance attached to therapy,¹⁶ medication adherence,¹⁷ therapy attendance,¹⁸ and increased change.¹⁹

Specifically with regard to eating disorders, Vansteenkiste et al.²⁰ found that external pressure to change was particularly elevated in patients with an eating disorder who engaged in nonsuicidal self-injurious behaviors. Furthermore, Mansour et al.⁵ showed that more self-endorsed forms of motivation at pretreatment predicted lower levels of eating preoccupation and binge eating at post-treatment in a group of outpatients with bulimia-spectrum symptoms, even after controlling for pretreatment levels of binge eating and psychiatric symptoms. In addition, although not grounded in the SDT-perspective, Geller et al.,²¹ showed that patients with an eating disorder with elevated precontemplation scores, which reflect a reduced willingness to pursue change, were less likely to enroll in treatment and, when they did enroll, were more likely to drop out. To the best of our knowledge, few studies examined associations between motivation for treatment and changes in BMI. One exception is a study by Rieger et al.²² who investigated the effects of motivation on weight gain in inpatients with anorexia nervosa. Their results showed that higher levels of readiness to change related to an increase in body mass index (BMI) in the subsequent weeks.

Fostering Self-Endorsed Motivation

Given the positive outcomes related to self-endorsed motivation, the question arises as to how the process of self-endorsement (i.e., internalization) can be nurtured. According to SDT, the social

context can stimulate or hinder the gradual acceptance of change by, respectively, supporting or thwarting three innate and basic psychological needs, that is, the needs for autonomy, competence, and relatedness.²³ The need for autonomy entails experiences of choicefulness and psychological freedom when carrying out an activity. To illustrate, the need for autonomy in a patient with anorexia nervosa is satisfied when she experiences a sense of initiative and volition while working on healthier eating habits. The need for competence concerns the experience of mastery and effectiveness in executing activities and handling challenges. Satisfaction of this need is, for example, apparent when a patient feels capable of adopting new and healthier eating behaviors. Finally, the need for relatedness constitutes having warm and trusting relationships. A patient who experiences a sense of trust with her therapist or who experiences a sense of closeness and understanding with fellow patients will feel satisfied with respect to her need for relatedness. Satisfaction of these three needs promotes positive outcomes including persistence, performance, and well-being.⁹ An increasing number of recent studies have examined the role of need satisfaction in eating-related outcomes in nonclinical samples. For instance, whereas need satisfaction was found to relate negatively to body image concerns,²⁴ need frustration (i.e., feeling controlled, feeling like a failure, and/or feeling socially isolated) related positively to binge-eating symptoms, both at the level of interindividual differences²⁵ and at the level of day-to-day fluctuations within individuals.²⁶ Furthermore, Dwyer et al.,²⁷ found, in a group of depressed and anxious patients, that autonomy need satisfaction during residential therapy predicted decreases in anxious and depressive cognitions which, in turn, related to decreases in anxiety and depressive symptoms. Besides being essential for people's general optimal functioning and thriving, SDT claims that need satisfaction is the critical mechanism underlying the process of self-endorsement.⁹ To use a metaphor, psychological need satisfaction represents the engine of self-endorsed change. That is, when the psychological needs get satisfied, the process of acceptance of change is more likely to unfold as clients have more energy available to work on their problems. Consistent with this, Markland and Tobin²⁸ showed that need satisfaction facilitated self-endorsed motivation in women referred to an exercise scheme and Milyavskaya and Koestner²⁹ found need satisfaction to relate to self-endorsed motivation across important life domains in a nonclinical population.

Autonomy-Supportive Counseling

Given the critical role of psychological need satisfaction in the process of self-endorsed motivation, motivating social contexts are those that support the satisfaction of these needs. Stated differently, social contexts need to provide the fuel necessary for the engine (i.e., the needs) to get started and to function optimally. In SDT, contextual autonomy support is considered a crucial facet of a need-supportive counseling style.⁹ Being autonomy-supportive vis-à-vis patients in a therapeutic setting entails taking their perspective, being responsive to their thoughts and feelings, and stimulating a sense of initiative.¹⁴ Even if choices are constrained, autonomy-supportive agents could foster need satisfaction by empathizing with the patients' frame of reference and by providing a clear and meaningful rationale for a request. A controlling approach, on the other hand, entails the active thwarting of the patients' sense of volition by conveying pressure, for instance, through the use of coercive language (e.g., "you must follow these guidelines"), the use of pressuring deadlines and controlling rewards, and by engaging in manipulative strategies such as guilt-induction, shaming or conditional regard.³⁰

Both experimental and correlational studies in nonclinical samples have amply demonstrated that autonomy support fosters need satisfaction in a diversity of life domains, including school, coaching, and parent-child relationships.⁹ In a therapeutic context, several studies provided evidence for the beneficial effects of perceived therapist autonomy support for various outcomes, including drop-out in patients with an eating disorder³¹ and self-endorsed motivation in patients with a depression^{12,32} as well as in a heterogeneous sample of psychiatric patients.¹⁶

From Therapists to Parents and Fellow Patients

Increasingly, parents are becoming involved in the treatment process of patients with an eating disorder, for instance, through the provision of education sessions.³³ Yet, few, if any, studies have examined whether the way parents approach their daughters' eating problems relates to their motivation for treatment. Past work in nonclinical populations showed that perceived parental autonomy support related positively to adolescents' need satisfaction and self-endorsed motivation in a variety of life domains, including schooling, friendships, and morality.³⁰

A shared feature of therapists and parents is that they both have a hierarchical relationship with the

patients. Yet, autonomy support is also assumed to play a role in more horizontal relationships such as friendships.³⁴ In the context of work, studies have shown that autonomy support from colleagues and from supervisors contributed independently to work satisfaction and psychological health.³⁵ Furthermore, Ntoumanis et al.,³⁶ showed that both peer and coach support are important with regard to motivation in young athletes. Thus, autonomy support in horizontal relationships, such as relationships with peers or colleagues, seems important for motivation and well-being.

The Present Study

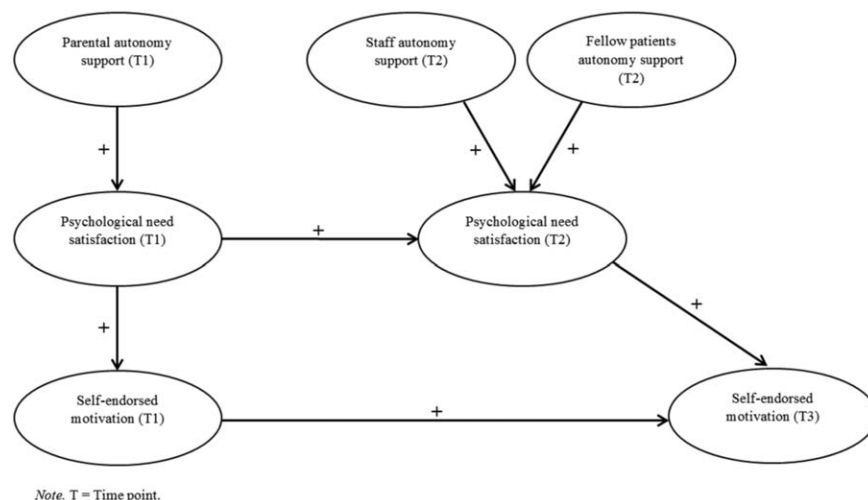
Guided by the hypothesized conceptual model depicted in Figure 1, the present study aimed to contribute to the existing literature on motivational dynamics in patients with eating disorders by pursuing the following four aims. First, we aimed to investigate possible mean-level changes in motivation. Does the group of patients show an overall increase in self-endorsed motivation throughout the treatment? In spite of the presumed dynamic nature of motivation, few studies have traced motivational changes during therapy. There are, however, two notable exceptions. Allen et al.⁶ showed that outpatients with an eating disorder receiving cognitive-behavioral therapy with four sessions of motivation-focused treatment, displayed more readiness to change at the end of therapy. Similarly, a study by Geller et al.,⁷ demonstrated that the level of internality (i.e., pursuing change out of internal as opposed to external reasons) increased during residential eating disorders treatment. In the current study, we expected a mean-level increase in

patients' self-endorsed motivation during treatment given that a motivation orientation phase was built into treatment.³¹

A second aim involved examining the role of relative (i.e., rank-order) changes in psychological need satisfaction in relative changes in self-endorsed motivation. When one patient, relative to another patient displays an increase in self-endorsed motivation, is this relative increase driven by a relative increase in need satisfaction? On the basis of SDT and as depicted in the lower parts of Figure 1, we anticipated that this movement towards more self-endorsed motivation across therapy would indeed be driven by experiences of need satisfaction during therapy.

Third, to provide a more comprehensive picture of whether different motivational sources can facilitate need satisfaction and self-endorsed motivation, this study addressed simultaneously the role of parents, staff members, and fellow patients. We considered it meaningful to examine the role of patients as they were involved in group therapy. Specifically, we examined whether perceived parental autonomy support would relate to the initial levels of need satisfaction and self-endorsed motivation patients bring into therapy. Next, the degree of perceived autonomy support provided by staff members and fellow patients was expected to relate to rank-order changes in need satisfaction and self-endorsed motivation during the therapeutic process (see Fig. 1). As can be noticed, psychological need satisfaction was assigned a central place in the model as the mechanism underlying self-endorsed motivation, with three different resources feeding into experienced need satisfaction at different moments.

FIGURE 1. The hypothesized model based on self-determination theory.



Fourth, given the limited number of studies on the role of motivation in eating disorder patients' weight gain during therapy, a final aim of the present study was to relate relative changes in self-endorsed motivation to relative changes in BMI in a subsample of anorectic patients. We expected changes in self-endorsed motivation to relate to changes in BMI throughout therapy.

Method

Participants and Procedure

This longitudinal study made use of two partly overlapping subsamples, which were collected as part of a broader study^{20,31,37} on the treatment of patients diagnosed with an eating disorder. In this broader study, 127 patients filled out a questionnaire at admission (T1), while only a part of this broader sample completed questionnaires 2 weeks after the start of treatment (T2) and at the end of treatment (T3). The two longitudinal samples used in the context of this study were subsamples of this broader sample. Specifically, the first subsample ($n = 84$) consisted of patients who participated both at T1 and at least one more time. Furthermore, this subsample consisted of patients with different eating diagnoses and was employed to address the first three aims. The second subsample ($n = 67$) consisted only of patients with anorexia nervosa and was employed to investigate the fourth aim. In total, 45 out of the 67 individuals in the second subsample also belonged to the first subsample such that the second subsample had 22 unique cases (i.e., 67–45) and the first subsample had 39 unique cases (i.e., 84–45). In light of the substantial overlap between the two subsamples, the larger sample size of the first subsample, the fact that three out of four research aims were investigated by means of the first subsample, and that there were no significant differences with respect to background characteristics between the two subsamples, we only describe the background characteristics of the first subsample here below. However, we do provide information concerning BMI of the second subsample because this is the critical outcome variable in the analysis with this subsample.

Participants from the first subsample were young and adult females aged 15–45 years ($M = 22.92$; $SD = 6.73$) who were hospitalized for an inpatient treatment for eating disorders in a Belgian clinic. Eating disorder diagnoses were based on criteria of the DSM-IV³⁸ determined by a questionnaire (i.e., the Eating Disorders Evaluation Scale³⁹) and a standardized interview. The diagnoses obtained were as follows (BMI is included in brackets per diagnosis type): 38 (45%) belonged to the anorexia nervosa restricting type ($MBMI = 14.18$, $SD = 1.67$), 7 (8%) to the anorexia nervosa bingeing-purging type ($MBMI = 16.17$, $SD = 2.12$), 22

(26%) to bulimia nervosa ($MBMI = 20.19$, $SD = 4.65$), 16 (19%) to eating disorder not otherwise specified ($MBMI = 20.70$, $SD = 5.84$); the diagnosis of one patient was missing. The current treatment lasted on average 135.70 ($SD = 50.20$) days, that is, about 4 months, and ranged between 25 and 249 days. On average, patients had been ill for about 4 years ($M = 4.33$, $SD = 1.59$, range = 2–7) and had followed on average 3.24 ($SD = 1.30$) and 1.85 ($SD = 1.17$) ambulant and residential treatments, respectively. Patients' education level (i.e., highest obtained degree) was as follows: 24% completed only elementary school, 33% had secondary education, 38% had post-secondary education, and information was missing for four patients. Finally, the majority ($n = 64$; 76.0%) of the patients came from intact homes and 56 (66.7%) still lived with (one of) their parents. With regard to subsample 2, 54 (81%) belonged to the anorexia nervosa restricting type ($MBMI = 14.13$, $SD = 1.78$) and 13 (19%) to the anorexia nervosa bingeing-purging type ($MBMI = 16.14$, $SD = 1.82$).

The inpatient treatment consisted of several phases. First, patients entered a motivation orientation phase (lasting 3 weeks or less), including psycho-education, motivational exercises to help patients reflect on the pro's and con's of changing their eating behavior, exploratory group sessions, and a one-day try out in the treatment group as to find out whether the treatment conditions would fit with their viewpoint.³¹ If patients decided to enroll in the program, a multidisciplinary treatment, mostly in group format, was offered to them, consisting of a combination of psycho-education, expressive therapy, psychomotor therapy, and education about food. At admission and when necessary, there were also individual therapy sessions. Finally, family meetings were organized and family therapy was offered optionally. Treatment duration could in theory vary between 4 and 5 months of which the last 4 weeks could be spent in day treatment. The end of treatment was highly dependent on the individual. The patient set goals for herself during the beginning of treatment. These goals were pursued and evaluated on an individual basis and adapted if needed. When a patient was able to regulate her eating behavior in a healthy way and felt capable to take personal responsibility for this, then treatment could be terminated. At the end phase of the residential treatment, arrangements were made for ambulant care.

Patients completed several questionnaires at three time points. At T1, the sample originally consisted of 127 participants. To investigate whether our first subsample of 84 participants would be representative for the population of patients filling out a questionnaire at entrance, a binary logistic regression analysis was performed. We chose to use regression analysis rather than univariate ANOVAs to compare differences between completers and noncompleters because regression analysis allowed us to examine these differences with regard to a large number

of variables simultaneously. We investigated whether these 84 participants (dummy coded as 1) differed from the 43 individuals who only took part at T1 (dummy coded as 0) with respect to demographic variables and psychological constructs assessed at T1. In Step 1, the demographic variables, namely age, diagnosis, the number of ambulant and residential treatments, and the duration of the eating problem were entered to predict nonparticipation at T2 and T3. Type of diagnosis (1 = anorexia nervosa restricting type; 2 = anorexia nervosa bingeing-purging type; 3 = bulimia nervosa; 4 = eating disorder not otherwise specified) was defined as a categorical variable with the last category indicated as the reference category. The chi-square statistic in Step 1 was not significant ($\chi^2(7) = 8.70, p < .28$). When introducing the psychological constructs (i.e., parental autonomy support, psychological need satisfaction, and self-endorsed motivation) in Step 2, the overall model was again not significant ($\chi^2(10) = 13.86, p = .18$). These results indicate that patients not participating in subsequent assessments did not differ in terms of demographic or psychological variables from the patients who participated at least twice.

Participation was anonymous and voluntary. Furthermore, patients (and, in case of minors, the parents) gave their written consent. In addition, the university Institutional Review Board and the Ethical Committee of the hospital gave approval for the study. At T1, participants completed questionnaires concerning demographic information, perceived parental autonomy support, need satisfaction and motivation. At T2, perceived staff and fellow patients' autonomy support, need satisfaction and motivation were assessed. Finally, at T3, motivation was assessed again^a. Patients filled out the questionnaires alone in their rooms in the clinic on a paper and pencil test. A likert scale ranging from 1 (completely disagree/completely not true) to 5 (completely agree/completely true) was used for all scales. BMI scores from T1 and T3 were collected through clinical records provided by the staff.

Measures

Autonomy Support: Parents (T1). At T1, patients filled out a nine-item questionnaire tapping into perceived parental autonomy support with regard to their eating problems. We adapted a previously developed scale of global parental autonomy support^{40,41} [which is based on the well-validated scales of parental autonomy support (i.e., perceptions of parents scale⁴²) and parental control (i.e., psychological control scale—youth self-report⁴³)] to assess parental autonomy support in the domain of eating problems. Items tapped into both per-

ceived support for autonomy (e.g., “My parents help me to freely decide to what extent and how I want to change something about my eating problem”) and perceived controlling behavior (e.g., “My parents try really hard to change my eating habits”). The items tapping into controlling parenting were reversed scored to obtain an aggregate score of perceived parental autonomy support ($\alpha = .81$). To provide further support for the convergent validity of this newly developed scale, we looked at the correlation between this newly developed questionnaire and the original global measure of parental autonomy support relative to control which was also filled out by the patients. As can be expected, the domain-specific and the general measure of parental autonomy support scales correlated positively ($r(82) = .56, p < .01$).

Autonomy Support: Staff and Fellow Patients (T2). Perceived autonomy support from staff members was assessed using the shortened 6-item version of the well-validated Health Care Climate Questionnaire (HCCQ⁴⁴). Items (e.g., “The staff/my fellow patients listen to the things I would like to do concerning my eating problem”) were slightly adjusted to the context of this study. Moreover, given that the HCCQ does not contain controlling items, we added five items tapping into autonomy-suppressing behaviors (e.g., “The staff/my fellow patients try really hard to change my eating habits”). These five self-constructed items were adapted from the Psychological Control Scale—Youth Self-Report.⁴³ Participants were instructed to report their general experiences with staff members at the clinic (i.e., psychologists, ergotherapists, and nurses). The items tapping into perceived autonomy support and control by fellow patients were similar, although two items were slightly modified to make them appropriate for peer-to-peer interactions. To obtain an aggregate score of autonomy support received from the staff members as well as from the fellow patients, controlling items were reversed and summed ($\alpha = .83$ and $.80$ for staff and fellow patients autonomy support, respectively).

Need Satisfaction in Dealing with Eating Problems (T1, T2). To tap into experiences of psychological need satisfaction while working on their eating problem, patients filled out an adapted version of the basic psychological needs scale (BPNS⁴⁵). Items tapped into satisfaction of the three needs (four items per need) postulated within SDT, namely relatedness (e.g., “I have good and satisfying conversations with other people about my eating problem”), competence (e.g., “I have confidence in my own capabilities to find a solution to my eating problem”), and autonomy (e.g., “To change something about my eating problem is my own free choice”). An average need satisfaction score was created by combining these three subscales as we were interested in general need satisfaction as an underlying mechanism of self-endorsed motivation.⁴⁶ Moreover, these combined scores showed good reliability ($\alpha = .85$ at T1 and $\alpha = .88$ at T2).

^aAlthough more questionnaires were filled out by the participants at the three time points, we only focused on a subset of these in the current study.

Motives for Eating Regulation (T1, T2, T3). The Self-Regulation Questionnaire-Eating Problems²⁰ was employed to assess patients' motives for working on their eating problems. Four different motives were assessed: external regulation (e.g., "because others would be mad at me if I wouldn't do so"), introjection (e.g., "because I would feel guilty and ashamed if I would not"), identification (e.g., "because this is personally important to me"), and integration (e.g., "because I have thought well about this issue and I believe that taking responsibility for my eating problem will be important for other things in my life"). The 16 items (4 per motive) were preceded by the following stem: "The reason why I would try to deal with my eating problem in a responsible way is ...". We deliberately chose to formulate this item stem broadly and to not specify a particular eating problem in the stem because we wanted the questionnaire to be relevant across types of eating disorder diagnoses. As such, scores of eating disorder patients with different diagnoses could be directly compared and all participants could be included in the analyses. On the basis of a principal component analysis conducted on this same sample in another contribution,²⁰ the subscales for integrated and identified motives were summed to create an internalized motive subscale. Given that the correlation between the three remaining subscales (i.e., internalized, introjected, and external regulation) followed an ordered pattern indicative of increasing self-acceptance of change, we combined, in line with previous work,⁴⁷ the different subscales into a composite score by weighting each of the subscales depending on their location on the self-endorsement continuum. Specifically, the composite score of self-endorsed change was computed as follows: (external * -2) + (introjected * -1) + (identified/integrated * 3). In other words, the composite score consisted of a weighted combination of volitional and pressuring forms of motivation, wherein the volitional motives were given a positive weight and the pressuring motives were given a negative weight. Furthermore, because external motivation reflects a complete lack of acceptance of change, whereas introjected motivation reflects partial acceptance, external motivation was given a more negative weight. Overall then, higher scores on this scale indicate higher levels self-endorsed motivation. This combined scale showed good reliability ($\alpha = .83$ at all three time points).

Body Mass Index (T1, T3)

We determined weight gains in patients with anorexia nervosa by looking at the BMI at admission and the BMI at discharge, which were collected through participants' clinical records as provided by the staff. The BMI is defined by an individual's body mass divided by the square of her height.

Plan of Analyses

To examine mean-level changes in self-endorsed motivation during treatment (Aim 1, subsample 1), we per-

formed a repeated measures ANOVA. To examine the relation between relative changes in need satisfaction and self-endorsed motivation (Aim 2, subsample 1), to investigate the role of perceived autonomy support (Aim 3, subsample 1) and to examine the effects of relative changes in self-endorsed motivation on weight gain in anorectic patients (Aim 4, subsample 2), path models were tested using MPlus 7⁴⁸ with maximum-likelihood as estimator. In these path models (see Fig. 1 for a graphical display of the hypothesized model) we modeled rank-order change in self-endorsed motivation, need satisfaction, and BMI by controlling for initial levels of these variables at the onset of the study.⁴⁹ In both subsamples there were missing data. With respect to the first subsample, all 84 participants had participated at T1, but some did not participate at T2 (8.3%) or at T3 (53.6%). Little's MCAR test⁵⁰ indicated that these missing data were missing completely at random ($\chi^2 (626) = 234.77, p = 1.00$). With respect to the second subsample, all 67 participants had participated at T1, but at T3 only 40.3% participated. However, these missing data were missing completely at random according to Little's MCAR test⁵⁰ ($\chi^2 (160) = 50.83, p = 1.00$). Because missing data were missing at random, the use of the full information maximum likelihood (FIML) procedure was appropriate to estimate missing data for both subsamples separately.⁵¹

To test indirect effects, we used bootstrapping (using 1,000 draws), a nonparametric resampling procedure that is currently highly recommended.⁵² Several indices were employed to evaluate the model fit, namely the χ^2 test, the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA). An acceptable fit was indicated by χ^2/df ratio of 2 or below, CFI values of .90 or above, and SRMR and RMSEA values of around .08 or below.^{53,54} In total, seven different structural models were tested, which were built gradually. In all models we controlled for background variables (e.g., the number of previous ambulant treatment) that correlated significantly with the study variables. Consistent with Aim 2, the first model examined whether changes in need satisfaction would relate to changes in self-endorsed motivation while controlling for baseline levels of need satisfaction and self-endorsed motivation. In the next four models, we examined, consistent with Aim 3, the role of perceived autonomy support from different social sources, namely (a) from parents at T1 in the prediction of need satisfaction at T1 (Model 2); (b) from the staff members at T2 in the prediction of need satisfaction at T2, when controlling for baseline levels in need satisfaction (Model 3); (c) from fellow patients at T2 in the prediction of need satisfaction at T2, when controlling for baseline levels in need satisfaction (Model 4). In both Models 3 and 4, we also included parental autonomy support at T1, yet focused on a single source of within-treatment autonomy support (i.e., either the staff or the fellow patients) to examine their

separate contribution. In Model 5, staff and fellow patients autonomy support were simultaneously modeled so as to examine their unique contribution to changes in need satisfaction and subsequent self-endorsed motivation. Model 6 was a follow-up model, in which fellow patients autonomy support was modeled as an intervening variable between perceived staff autonomy support and need satisfaction. The second-order Akaike Information Criterion (AIC_c , suitable for small sample sizes) was used to decide which of these two alternative models (Model 5 and Model 6) was the best with respect to fit to the data and simplicity, with a smaller AIC_c indicating the better model.⁵⁵ Finally, in Model 7 (employing subsample 2) we investigated, consistent with Aim 4, whether increases in self-endorsed motivation would relate to increases in BMI throughout treatment in a subsample of patients with anorexia nervosa, when controlling for treatment duration.

Results

Descriptive Statistics and Preliminary Analyses

To obtain a first and descriptive understanding of the relations between the study variables in subsample 1, bivariate correlation analyses were performed (see Appendix). Perceived parental autonomy support did not relate to perceived autonomy support from the staff members ($r(82) = .18, p > .05$) or from the fellow patients ($r(82) = -.06, p > .05$), although these latter two were related ($r(82) = .59, p < .01$). Perceived parental autonomy support related positively to need satisfaction at T1 ($r(82) = .39, p < .01$) and T2 ($r(82) = .33, p < .01$) as well as to self-endorsement at T1 ($r(82) = .33, p < .01$) and T3 ($r(82) = .30, p < .01$), but not at T2 ($r(82) = .18, p > .05$). All correlations between autonomy-support provided by staff and fellow patients (T2) and need satisfaction (T2) and self-endorsement (T2 and T3) were significant and positive (with r s ranging between .26 and .70, all p s $< .05$). Similarly, all correlations between need satisfaction and self-endorsed change, within and between time points, were significantly positive (with r s ranging between .26 and .73, all p s $< .05$). Both self-endorsed motivation and need satisfaction displayed significant rank-order stability across the time points (with correlations ranging between .33 and .70, all p s $< .01$). Finally, BMI also displayed significant rank-order stability between T1 and T3 ($r(82) = .54, p < .01$).

Correlation analyses also showed that the number of ambulant treatments related positively to need satisfaction at T2 ($r(82) = .32, p < .01$) and to self-endorsement at T3 ($r(82) = .30, p < .01$), that age related positively to self-endorsement at T3

($r(82) = .24, p < .03$), and that BMI at T1 related positively to need satisfaction at T2 ($r(82) = .29, p < .01$). Accordingly, these variables were controlled for in subsequent model testing. Other background variables (i.e., diagnosis type, duration of illness, number of previous residential treatments, education level, home and living situation, and treatment duration) were not correlated with the study variables and were not considered further.

As for subsample 2, bivariate correlation analyses showed that BMI at T3 related significantly to diagnosis type (anorexia nervosa restrictive type coded as 1 and anorexia nervosa bingeing-purging type coded as 2) ($r(65) = .34, p < .01$) as well as to treatment duration ($r(63) = .60, p < .01$). Therefore, we controlled for these two variables in the analyses related to subsample 2.

Primary Analyses

Aim 1: Examining Mean-Level Changes in Self-endorsed Motivation During Treatment. A repeated measures ANOVA with a Greenhouse–Geisser correction (due to violation of the assumption of sphericity) revealed a significant linear increase in self-endorsed motivation across the three time points ($F(1, 83) = 6.79, p < .02$ ($\eta^2 = .08$)). Although there was a steady increase in self-endorsed motivation per time point (i.e., T1 $M = 18.84, SD = 13.75$; T2 $M = 20.78, SD = 12.56$; T3 $M = 23.00, SD = 11.30$), post-hoc tests employing the Bonferroni correction revealed that there was only a significant difference between T1 and T3 ($p < .04$).

Aim 2: Psychological Need Satisfaction as the Fuel for Self-Endorsed Motivation. Fit indices of all structural models can be found in **Table 1**. In the first structural model we examined whether rank-order changes in need satisfaction would relate to rank-order changes in self-endorsed motivation. To do so, we allowed paths from need satisfaction at T2 to self-endorsed motivation at T3, while controlling for baseline differences in these constructs.^b

^bWe also tested an alternative model by instead of controlling for baseline self-endorsed motivation, we controlled for self-endorsed motivation at T2. We added paths from need satisfaction at T2 to self-endorsed motivation at T2 and T3. In addition, autoregressive paths between need satisfaction at T1 and T2, and between self-endorsed motivation at T2 and T3 were allowed. Need satisfaction at T2 related strongly to self-endorsed motivation at T2 ($\beta = .73, p < .001$), but less strong to self-endorsed motivation at T3 ($\beta = .20, p > .05$). Therefore, we decided to control only for self-endorsed motivation at baseline and not at T2, because it seems that changes in need satisfaction can predict changes in self-endorsed motivation during the entire treatment, but not changes in self-endorsed motivation between T2 and T3.

TABLE 1. Fit indices of all tested models

Model	χ^2/df	CFI	SRMR	RMSEA
1. Psychological need satisfaction as fuel for self-endorsed motivation	0.66	1.00	0.04	0.00
2. Perceived parental AS	0.70	1.00	0.07	0.00
3. Perceived parental and staff AS	0.70	1.00	0.06	0.00
4. Perceived parental and fellow patients AS	1.07	0.99	0.09	0.03
5. Perceived parental, staff and fellow patients AS	0.84	1.00	0.07	0.00
6. Perceived fellow patients AS as mediator	0.86	1.00	0.07	0.00
7. Self-endorsed motivation as a predictor of BMI	0.57	1.00	0.06	0.00

Note. AS = autonomy support; BMI = body mass index; CFI = comparative fit index; SRMR = standardized root mean square residual; and RMSEA = root mean square error of approximation.

Subsequently, a reciprocal path from self-endorsed motivation at baseline to need satisfaction at T2 was added to investigate whether patients with elevated levels of initial self-endorsed motivation derive more subsequent need satisfaction from the therapy. This model had an excellent fit (**Table 1**). Specifically, relative increases in need satisfaction from T1 to T2 had a marginally significant effect on relative increases in self-endorsed motivation from T1 to T3 ($\beta = .33, p < .08$). These results thus suggest that changes in need satisfaction tended to relate to changes in self-endorsed motivation, suggesting that need satisfaction may be the fuel for increases in self-endorsed motivation. Interestingly, the reversed relation also emerged, with self-endorsed motivation at T1 relating positively to relative increases in need satisfaction from T1 to T2 ($\beta = .27, p < .03$). Said differently, need satisfaction and self-endorsed change seem to yield a reciprocal relation to each other over time.

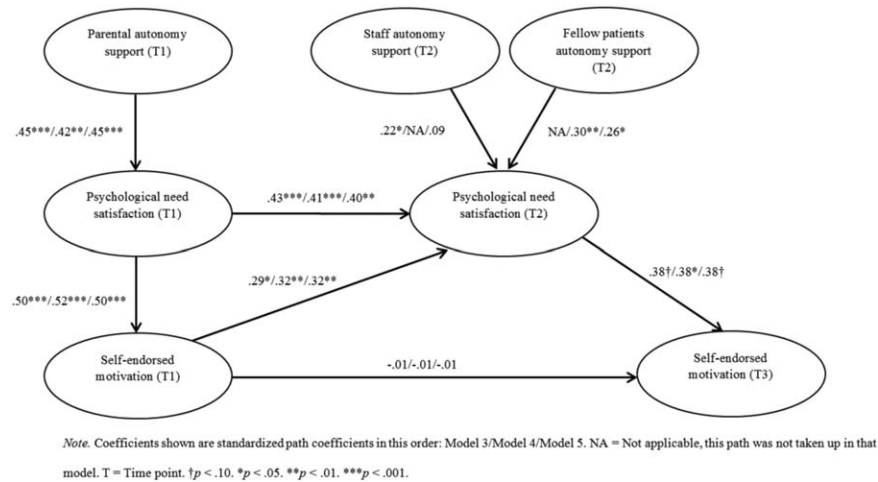
Aim 3: The Role of Contextual Perceived Autonomy Support. Model 2, in which parental autonomy support at T1 was added to Model 1 as a predictor of concurrent need satisfaction yielded an acceptable fit (**Table 1**). Perceived parental autonomy support related positively to need satisfaction at T1 ($\beta = .40, p = .001$) which, in turn, related to self-endorsed motivation at T1 ($\beta = .52, p < .001$). When adding a direct path between parental autonomy support and self-endorsed motivation at T1, this path was not significant and was dropped again from the model. The indirect effect from perceived parental autonomy support to self-endorsed motivation at T1 via need satisfaction at T1 was significant (95% CI [0.07, 0.35]). Thus, parental autonomy support seems to contribute to higher levels of self-endorsed motivation at the start of therapy via need satisfaction. To examine in a more explorative fashion whether perceived parental autonomy support would contribute to need satisfaction and self-endorsed motivation for change during therapy, we allowed one by one direct paths from parental autonomy support to need satisfaction at T2 and

self-endorsed motivation at T3. Yet, none of these were significant and thus were left out of the model. Similar to Model 1, self-endorsed motivation at T1 and T3 were unrelated, but need satisfaction at T2 was related significantly to self-endorsed motivation at T3.

Model 3 built on Model 2 by adding perceived autonomy support from the staff at T2 as a predictor of need satisfaction at T2 and was found to yield an acceptable fit (**Table 1**). The model is displayed graphically in **Figure 2** (i.e., first-ordered regression coefficients). As can be noticed, perceived autonomy support from the staff members related positively to changes in need satisfaction, which, in turn, related positively to changes in self-endorsed motivation across treatment. A direct path from perceived staff autonomy support to self-endorsed motivation at T3 was added, but was again dropped due to being nonsignificant. Further, the indirect effect from staff member autonomy support to changes in self-endorsed motivation via changes in need satisfaction just fell short of significance (95% CI [-0.05, 0.21]). All other paths (effect sizes and significance levels) were comparable to Model 2. Autonomy support from the staff thus relates to more need satisfaction which, in turn, relates to higher levels of self-endorsed motivation at the end of treatment.

In Model 4 we replaced perceived staff autonomy support by perceived fellow patients autonomy support as a predictor of need satisfaction at T2. This model had an acceptable fit (**Table 1**). As graphically displayed in **Figure 2** (i.e., second-ordered regression coefficients), autonomy support from the fellow patients related positively to changes in need satisfaction which, in turn, related significantly to changes in self-endorsed motivation. A direct path from perceived autonomy support from the fellow patients to self-endorsed motivation at T3 was also added, but was dropped again due to being non-significant. The indirect effect of fellow patients autonomy support to changes in self-endorsed motivation via changes in

FIGURE 2. Structural model depicting the relation between perceived contextual autonomy support (from parents, staff, and fellow patients), changes in psychological need satisfaction and changes in self-endorsed motivation across therapy (i.e., model 3, 4, and 5).



need satisfaction was marginally significant (90% CI [0.02, .26]). Again, all other paths were similar to the previous models (effect sizes and significance levels). Thus, autonomy support from the fellow patients related to self-endorsed motivation at the end of therapy via satisfaction of the needs.

Model 5 included all three sources of perceived autonomy support (i.e., parents, staff members, and fellow patients) and had a good fit to the data (Table 1). This model is graphically displayed in Figure 2 (i.e., third-ordered regression coefficients). First, as also seen in all the previous models, perceived parental autonomy support related positively to need satisfaction at T1, which, in turn, related to self-endorsed motivation at T1. In Model 3 and 4 we saw, respectively, that perceived autonomy support from the staff and perceived autonomy support from the fellow patients related positively to changes in need satisfaction, but in Model 5 (where both variables were entered together) this was only the case for autonomy support from the fellow patients. Apparently, only perceived autonomy support from the fellow patients had a unique effect on the satisfaction of the needs. Need satisfaction at T2 was again, after controlling for baseline levels in need satisfaction, positively related to self-endorsed change at T3 indicating more optimal motivation at the end of treatment for people whose needs got increasingly satisfied during the treatment.

In Model 5, perceived staff autonomy support was no longer related to need satisfaction when perceived fellow patients autonomy support was entered simultaneously in the model. Yet, staff

members could still affect patients' motivation indirectly by creating a positive motivational climate in which patients adopt an autonomy-supportive approach towards each other. We tested this possibility in an additional, theoretically not anticipated, model. Specifically, we tested a mediation model with perceived fellow patients autonomy support intervening in the relation between perceived staff autonomy support and need satisfaction. This model (Model 6) yielded a good fit (Table 1) and is displayed in Figure 3. As shown, staff autonomy support positively to fellow patients autonomy support, which, in turn, related to changes in need satisfaction. The indirect effect of staff autonomy support to changes in need satisfaction via fellow patients autonomy support was significant (95% CI [0.04, 0.30]). All other paths were similar to Model 5 (effect sizes and significance levels). With respect to the model comparison between Model 5 and 6, the AIC_c of the models indicated that Model 5 (AIC_c = 1003.74) was better than Model 6 (AIC_c = 1204.90) with respect to fit to the data and simplicity.

Aim 4: Self-Endorsed Motivation as a Predictor of BMI in Patients with Anorexia Nervosa. In Model 7, we looked at the relation between self-endorsed motivation at T3 and BMI at T3. Therefore, self-endorsed change at T3 was entered as a predictor of BMI at T3 while controlling for baseline levels of self-endorsed change and BMI. This model yielded an acceptable fit (Table 1). As depicted in Figure 4, increases in self-endorsed motivation T3 related positively to increases in BMI from T1 to T3.

Discussion

The study of motivational dynamics in patients with eating disorders has attracted increasing attention over the past decade.² Motivation constitutes a critical issue as therapists often face patients who are ambivalent to change, with some patients being completely discouraged after repeated failures and others being reluctant to undertake any change at all.¹ While several motivational models have been introduced based on clinical expertise with patients with an eating disorder,⁵⁵ Vansteenkiste et al.² argued that self-determination theory⁹ (SDT), a broad-band theory on human motivation and behavioral change, may help to shed a refreshing light on the way motivational dynamics can be conceptualized and motivation can be fostered in patients with an eating

disorder. The present study aimed to add to the growing number of studies on the application of SDT in the field of eating disorders. Furthermore, it intended to shed more light on common factors in therapeutic change as the identification of these factors may also lead one to make adaptations to existing treatment program as to maximize voluntary change in patients with an eating disorders.⁵⁶

From the SDT-perspective, in order for people to engage in lasting change it is critical that patients gradually accept the reasons underlying change during therapy,¹⁴ such that they leave therapy with an increased willingness to work on their eating problems. The present study revealed that patients reported an overall (i.e., mean-level) increase in self-endorsed reasons for change throughout the therapy which is in line with the previously mentioned studies by Allen et al.⁶ and Geller et al.⁷

FIGURE 3. Structural model depicting the mediating role of fellow patients autonomy support in the relation between staff autonomy support and changes in psychological need satisfaction (i.e., model 6).

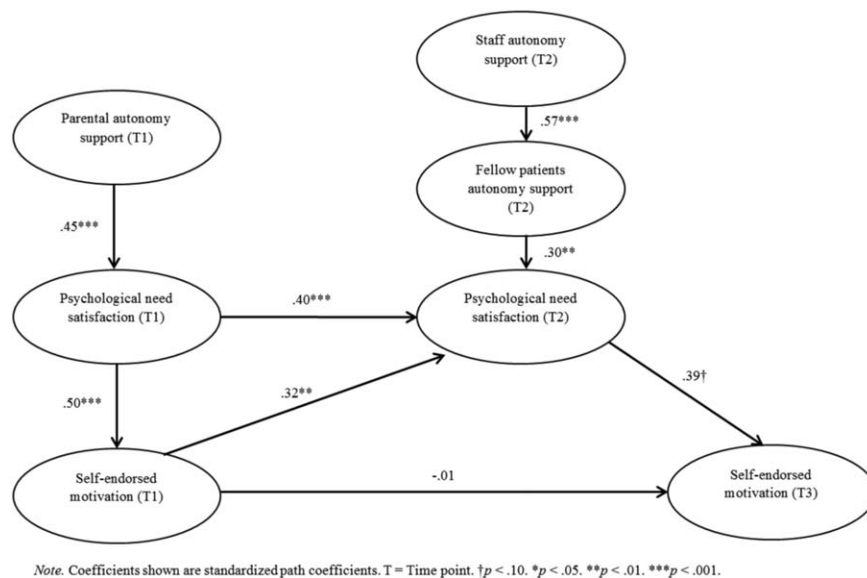
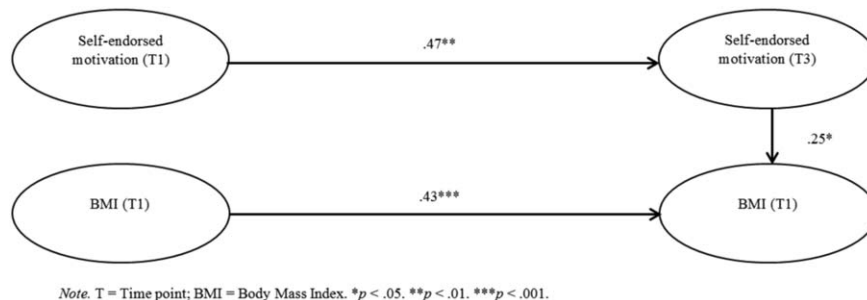


FIGURE 4. Structural model depicting the association between changes in self-endorsed motivation and body mass index across therapy (i.e., model 7).



Furthermore, relative increases in self-endorsed motivation related to increases in BMI in the group of patients with anorexia nervosa. This is in line with the study by Rieger et al.²² showing that self-endorsed motivation related to an increase in BMI in patients with anorexia nervosa.

Apart from documenting changes in self-endorsed motivation for change and BMI, the present study examined the mechanism underlying these changes. This is an important issue because, without insight into the driving forces of change, it is hard to provide advice to therapists about which therapeutic style to adopt during counseling. Within SDT, a pivotal role is assigned to the basic psychological needs for autonomy, competence, and relatedness to foster self-endorsed motivation. Consistent with our hypothesis about need satisfaction as the engine behind self-endorsed motivation, we found that satisfaction of patients' needs accounted for the move towards more self-endorsed motivation towards the end of therapy. Interestingly, need satisfaction not only contributed to changes in self-endorsed motivation, but patients entering therapy with a more self-endorsed motivation also derived greater need satisfaction from the therapy. Sheldon and Elliot⁴⁶ found similar results in that people who pursued goals that are in concordance with whom they are, showed more persistence and experienced more success with respect to these goals, leading to more experienced need satisfaction. Patients' motivation at entrance can thus be seen as an important indicator of the degree to which these patients can benefit from treatment. Thus, this finding indicates that that some patients, that is, those entering with elevated levels of self-endorsed motivation, might be capable to proactively generate their own need-satisfying experiences such that they get involved in a positive change cycle.

Autonomy support provided by important others within the therapeutic context has received some attention in previous literature, although few studies dealt specifically with the treatment of eating disorders. Findings from these studies suggest that perceived autonomy support (mainly investigated as experienced from the therapist) is related to positive outcomes such as more need satisfaction⁵⁷ and higher levels of optimal motivation.¹² Most studies, however, have not looked at these outcomes simultaneously, thus precluding an integrative investigation of the processes underlying the beneficial effects of perceived autonomy support. Findings from this study showed that perceived autonomy support has its beneficial effects on self-endorsed motivation for change through satisfac-

tion of the three psychological needs. In addition, a rather unique feature of the current study involved its examination of the role of different key figures in patients' lives in the process of fostering self-endorsed motivation. Specifically, apart from examining the role of staff members, we also examined the role of parents and fellow patients in stimulating a greater willingness to change in patients with an eating disorder.

Given the group-based treatment that was offered to the patients, we deemed it important to study the role of the staff and fellow patients. Although staff autonomy support related to changes in need satisfaction and subsequent changes in self-endorsed motivation when studied in isolation, this association fell below significance when the degree of experienced fellow patients autonomy support was controlled for. This is a remarkable and surprising finding, given that previous studies did demonstrate a significant and important role of staff autonomy support on patients' motivation to change.¹²

Although future research needs to replicate the current findings, we want to add three thoughts. First, staff members might play a crucial role in stimulating self-endorsed motivation in patients at a more general level. For instance, they can create a therapeutic climate wherein patients themselves learn to adopt an autonomy-supportive attitude vis-à-vis each other. A supplementary mediation model (i.e., Model 6) in the current study provided support for such reasoning, although this model did not fit to the data as good as Model 5 and thus should be interpreted with caution. Alternatively, it might be the case that fellow patients have a stronger impact on patients' motivation because they have more common experiences. For instance, Swift and Dieppe⁵⁸ suggest that sharing stories between fellow patients can be helpful, because hearing about feelings of other patients can give a patient the feeling that he/she is also allowed to feel these emotions. Finally, we need to highlight that perceptions of autonomy support concerned the entire staff. If patients had rated the degree of experienced autonomy support with respect to their psychotherapist, perhaps, therapist autonomy support would have emerged as a unique predictor of need satisfaction and subsequent self-endorsed motivation.

Finally, our findings demonstrated that perceived parental autonomy support is concurrently associated with self-endorsed motivation via need satisfaction. Although parental autonomy support related indirectly to self-endorsed motivation at the onset of treatment, it did not relate to need satisfaction and motivation assessed at subsequent

moments during therapy. This seems logical given that patients were hospitalized during treatment and had rather limited contact with their parents, relative to staff members and fellow patients. It could be the case, however, that parents play an essential role during ambulant treatment and again when patients return home after treatment.

Practical Implications

The current findings show that motivation is a dynamic process, which can be promoted through an autonomy-supportive approach. Furthermore, this autonomy support can originate from the therapists as well as from the fellow patients. Although there are similarities in the way these two social sources can be autonomy supportive, for example by being open and empathic to the thoughts and feelings of the patient, there are some special issues associated with each specific source of autonomy support that we would like to elaborate on. First, fellow patients can play differential roles with respect to the need satisfaction of patients. They can be autonomy supportive and strengthen each other in the process of change, but they can also be controlling by, for example, not tolerating the feelings of another patient or by conveying criticism and disappointment towards a patient who has not lived up to their standards. Within group therapy, therefore, it is important that an autonomy-supportive climate is created (by the staff members) wherein the relationship between patients can be stimulated to reflect openness and respect for each other's choices to ensure a need-satisfying context for patients.

Second, we would also like to elaborate on the role of staff members in creating an autonomy-supportive climate. Often the concept of autonomy support as proposed by SDT is confused with supporting independence.⁵⁹ However, the intention of an autonomy-supportive therapeutic context is not to foster independent functioning of the patient. Indeed, patients often need a lot of guidance and show dependence on the caregiver. What is important is that a patient feels that she is the one who wants to change, that she endorses the values and behaviors that are promoted within therapy and that she takes ownership in this change process. Thus, providing autonomy support and structure (i.e., guidance) go hand in hand. Such an autonomy-supportive attitude can be perfectly integrated within current evidence-based treatments, like Cognitive Behavioral Therapy (CBT), because the way (e.g., an autonomy-supportive way) in which values and behavioral regulations

(e.g., cognitive restructuring) from such treatments are being brought to the patient plays a significant role in determining the outcomes of therapy via the effect this has on motivation. As shown by Zur-off et al.¹² in a population of depressed patients, autonomy support and autonomous motivation are beneficial across different treatments and can be considered as common or nonspecific factors in treatment.⁶⁰ Although more research is needed, there is little reason to expect that the critical role of autonomy support and need satisfaction as observed in the current inpatient group would not generalize to outpatient treatment. Yet, the role played by different authority figures may change somewhat as parents may have a stronger continuous impact when their daughters are at home. Also, the manifestation of autonomy support in group dynamics might be different from how an individual therapist approaches patients during inpatient treatment on a one-to-one basis.

Finally, the present results also provide more insight into the role of the parents. Parents can provide autonomy support to their children and this fosters a more self-endorsed motivation. It is, therefore, important to make parents aware of their crucial role and to stimulate autonomy-supportive parent-child communication during treatment.

Limitations and Future Research Directions

There were several limitations of this study. First, the sample size was relatively small thus restricting the power of our analyses. Second, although the assessment of constructs at multiple moments during therapy was a strength, the substantial drop-out, mainly at Time 3, was unfortunate. These missing data were, however, missing completely at random and were estimated reliably using appropriate and state-of-the-art procedures. A third limitation was the sole use of self-report measures. Especially with the assessment of autonomy support, future studies could also investigate this construct more objectively by, for example, asking staff members to report on the autonomy support provided by them or their colleague or by videotaping and coding interactions between staff members and patients or between fellow patients. In addition, several of the self-report measures were modifications of existing questionnaires. Although the internal consistency and convergent validity of the measures in this study was adequate, further research is needed to address the psychometric properties of these scales, including test-retest reliability. Furthermore, the measure of self-endorsed motivation that was used in the present study

addressed patients' eating problems in a broad manner. Future studies could look into motivation for changing specific eating problems. Although subsample 1 consisted of patients with different eating disorder diagnoses, due to the small sample size we were unable to test whether the proposed integrative model differed between different groups of patients. Hence, future research with more extensive samples may examine whether our model is equally applicable across patients with different eating disorders. Lastly, we only investigated processes at the start and during treatment. It would have been interesting, however, to look at the development of need satisfaction and motivation following treatment to see whether autonomy support experienced during treatment has long-lasting effects on these two motivational processes.

Conclusion

In summary, this study contributed to the understanding of motivational dynamics during therapy in patients with an eating disorder. It illustrated the crucial role of parents, staff members of the therapeutic setting, and fellow patients in fostering change. By providing autonomy support, these important figures in patients' lives foster need satisfaction and, ultimately, self-endorsed motivation to change. The results thus point to the importance of establishing an autonomy-supportive climate during residential group therapy. Given the promising results obtained in the current study, future research may further address the role of autonomy support in the treatment of eating disorders so as to enhance the effectiveness of treatment and facilitate long-lasting change.

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Appendix: Descriptives, Internal Consistencies, and Correlations Between the Study Variables in Subsample 1

	1	2	3	4	5	6	7	8	9	10
Time 1										
1. Perceived parental AS	.81									
2. Psychological need satisfaction	.39 ^c	.85								
3. Self-endorsed motivation	.33 ^c	.52 ^c	.83							
4. BMI	.03	.15	.20	–						
Time 2										
5. Perceived staff AS	.18	.26 ^b	.12	.41 ^c	.83					
6. Perceived fellow patients AS	–.06	.29 ^c	.08	.33 ^c	.59 ^c	.80				
7. Psychological need satisfaction	.33 ^c	.62 ^c	.56 ^c	.29 ^b	.37 ^c	.43 ^c	.88			
8. Self-endorsed motivation	.18	.45 ^c	.70 ^c	.21 ^a	.36 ^c	.43 ^c	.73 ^c	.83		
Time 3										
9. Self-endorsed motivation	.30 ^c	.26 ^b	.33 ^c	.11	.15	.04	.37 ^c	.37 ^c	.83	
10. BMI	.29 ^b	.21 ^a	.22 ^a	.54 ^c	.61 ^c	.29 ^b	.46 ^c	.39 ^c	.30 ^b	–
<i>M</i>	1.37	3.72	18.84	14.52	1.11	1.25	3.87	20.78	23.00	18.11
<i>SD</i>	1.53	.73	13.75	1.93	1.25	1.21	.68	12.56	11.30	2.29

Note. Internal consistencies are displayed on the diagonal. AS = Autonomy support; BMI = Body Mass Index. *M* = Mean; *SD* = Standard deviation.

^a*p* < .10.

^b*p* < .05.

^c*p* < .01.