Motiv Emot
DOI 10.1007/s11031-008-9086-0

ORIGINAL PAPER

A projective assessment of autonomous motivation in children: Correlational and experimental evidence

Idit Katz · Avi Assor · Yaniv Kanat-Maymon

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Abstract This article presents two studies aimed at validating a new TAT-like projective measure of autonomous motivation in children. Study 1 assesses the validity of the new measure by correlating it with self-report questionnaires of autonomous motivation, positive and negative affect, task value and mastery goal orientation. Study 2 is an experiment in which autonomous motivation is manipulated and then assessed with the new projective measure and with a self-report scale. Results of both studies support the validity of the new projective measure. In study 2, regression analysis suggests that the new projective measure is sensitive to aspects of experimentally induced autonomous motivation that are not captured by a self-report measure.

Keywords Autonomous motivation · Controlled motivation · Projective method · Self-report method · Measurement

Introduction

Self-report questionnaires are widely used in motivational research (Pintrich and Schunk 2002). However, impression-management processes and lack of sufficient self-knowledge often decrease the validity of these measures (e.g., Assor and Connell 1992). Furthermore, self-report methods may not be able to capture more implicit and dynamic motivational processes (Thrash and Elliot 2002; King 1995; Spangler 1992).

Given that projective methods may be more sensitive to implicit ongoing motivational processes (e.g., McClelland 1987, 1992; McClelland et al. 1989) and are less susceptible to the effect of impression management and insufficient self-knowledge, it appears important to include such methods in motivational assessments. Thus, the use of projective instruments may enrich the motivational picture elicited by self-report methods and help to improve the validity of motivational assessments (Sokolowski et al. 2000).

While projective measures are widely used in the assessment of the achievement, power, affiliation, and intimacy motives (e.g., McAdams 1991, 1992; McClelland 1955; McClelland et al. 1989), they are rarely used to assess intrinsic or autonomous motivation. Given the potential contribution of projective measures to motivational assessment, the purpose of this study is to develop and validate a projective measure of autonomous motivation.

The article begins with a brief summary of the construct of autonomous motivation, based on Deci and Ryan's self-determination theory (Deci and Ryan 1985, 2000). Then we briefly survey various methods of autonomous motivation measurement and continue by describing our research.

The relative autonomy continuum

Self-Determination Theory (SDT—Deci and Ryan 1985; Ryan and Connell 1989) posits five types of perceived motivations (sources or reasons for intentional action) that may be placed along a continuum of autonomy. The least autonomous motivation is termed *external*. Behavior regulated in this manner is controlled by external

I. Katz (✉) · A. Assor · Y. Kanat-Maymon
Ben-Gurion University of the Negev, Beer-Sheva, Israel
e-mail: katzid@bgu.ac.il

A. Assor
e-mail: Assor@bgu.ac.il

contingencies involving the threat of punishment or the offering of a material reward rather than volition (Ryan and Connell 1989). Such behaviors persist only when the contingencies are present and are associated with poor adjustment and ill-being (Grolnick and Ryan 1989). Next on the autonomy continuum is a motivational style termed *introjection*. In this type of motivation, behavior is controlled by the desire to avoid feeling guilty, ashamed, or unworthy, as well as striving for highly positive evaluations (by oneself and by others).

Although in introjected motivation the enactment of behavior is not dependent on specific external contingencies, this style is still considered relatively controlled (rather than autonomous) because people still feel that they are acting because they have to and not because they want to. In other words, the formerly external source of coercion has been "introjected" and now resides within the person, so that he or she now feels controlled by internal contingencies that link feelings of self-esteem and social acceptance to the enactment of specific behaviors or attributes (Assor et al. 2004).

The next motivation on the continuum is termed *identified* and is considered relatively autonomous because the person has accepted the value of the activity as his or her own. An identified motivation, although not purely intrinsic, is said to result from identifying with the importance of the behavior in view of one's personal values and goals. This form of motivation is accompanied by an experience of choice rather than pressure and by proactive coping and well-being (Grolnick and Ryan 1989; Ryan et al. 1993). The next motivation—*integrated*—results from reciprocally assimilating the identifications with other aspects of oneself. The two last-mentioned forms of motivation, the identified and the integrated, are considered relatively autonomous; when people regulate their behavior in these ways, they experience a sense of self-determination. The most autonomous motivation is termed *intrinsic*. Purely intrinsic motives involve engagement in an activity for its own sake. They are characterized by enthusiasm, spontaneity, excitement, intense concentration, and joy. In sum, the SDT model of motivation proposes five motivation types reflecting different levels of perceived autonomy versus coercion.

As suggested by Vallerand (1997), the different levels of perceived autonomy and self-determination exist at three levels of generality: The first level, termed *situational*, pertains to the motivation that an individual experiences toward an activity at a specific point in time. The second level, termed contextual, concerns a more generalized motivation toward broad spheres of activities or life contexts such as school, work, and sports. The third level refers to a personality motivational orientation. Our research examined the validity of the proposed projective measure as an indicator of participants' perceived autonomy in a specific situation and a broader life context (Vallerand 1997; Guay et al. 2003).

Assessing autonomous motivation via self-reports

Within SDT, autonomous motivation is often assessed via self-report questionnaires modeled after Ryan and Connell's Perceived Locus of Causality questionnaire (1989). In this instrument, people respond to a set of items that reflect different reasons for acting. The reasons represent the motivations that reside at different points on the perceived autonomy continuum. To arrive at a global indicator of autonomous motivation, researchers (e.g., Black and Deci 2000; Sheldon et al. 2004; Vansteenkiste et al. 2005a) often subtract the controlled motivations (external and introjected) from the autonomous motivations (usually intrinsic and identified)[1] The resulting global indicator of autonomous motivation is associated positively with various desirable outcomes and negatively with various undesirable outcomes (Sheldon et al. 2004; Vansteenkiste et al. 2004; Vansteenkiste et al. 2005b).

Over the years, various indices of autonomous motivation have been developed to assess motivation in many domains (academic, pro-social, healthcare, sports/exercise, religion, close relationships, etc.) among people of various ages. These indices yield important and interesting information (e.g., Roth et al. 2006; Ryan and Deci 2000). However, given the aforementioned limitations of self-report measures, researchers concerned with autonomous motivation have long tried to use measures of autonomous motivation that do not rely only on participants' self-reports (Thrash and Elliot 2002; King 1995; Spangler 1992). Thus, studies focusing on autonomous motivation and the related concept of intrinsic motivation often use behavioral measures.

Assessing autonomous motivation via behavioral measures

When assessing autonomous or intrinsic motivation via behavior, researchers seek evidence indicating that participants are engaging in the activity of their own choice and not due to some external inducement. This is often done using the well-known "free choice" paradigm (Deci 1971; Deci and Ryan 1985; Greene and Lepper 1974; Pritchard et al. 1977). Another behavior-based assessment method

[1] Studies focusing on children rarely assess integrated motivation because this type of motivation appears to require a relatively high level of maturity and psychological development (Ryan and Connell 1989; Roth et al. 2006).

examines participants' facial expressions that indicate interest and concentration (Reeve and Nix 1997).

Despite their proven utility, behavioral measures have several limitations. First, they do not directly indicate what participants think or feel about the activity at issue. For example, although it is logical to assume that tasks freely chosen are intrinsically motivated, this behavior may still be motivated by a controlling introjected regulation that prompts the person to engage in it in order to maintain his or her sense of self-worth or to avoid guilt (Katz and Assor 2003, 2007; Ryan et al. 1991). Furthermore, behavioral measures are not easy to administer in educational settings.

Assessing autonomous motivation via projective measures

Motivational researchers have often used TAT-based projective methods to assess various types of motivation (McClelland 1955; McAdams 1991, 1992). However, the projective method has hardly been used in the assessment of autonomous motivation. One study that comes close to assessing autonomous motivation by means of a projective measure is Ryan and Grolnick (1986). Students in grades 4–6 were asked to write a narrative for a TAT-like picture. Their projective stories were analyzed in six dimensions: technical goodness, creativity, the degree of agency and personal responsibility that the protagonist displays in the story, the degree of autonomy afforded by the teacher in the story, the effort expended, and expressions of aggressiveness. Thus, Ryan and Grolnick use TAT-like pictures to investigate variables that, although theoretically related to autonomous motivation, are not identical to it.

Given the widespread use of projective methods in the assessment of other motivational constructs and the lack of projective measures of relative autonomous motivation, our research was designed to develop such a measure. In view of the limitations of self-report and behavioral measures, the use of a projective measure, in conjunction with other types of assessment methods, may elicit a more complete and accurate understanding of the motivational experience.

To validate the new projective measure, we examined whether TAT like pictures of children, accompanied by brief sentences stating that the child is about to engage or has just finished engaging in an activity, can capture situational (e.g., a dance class) or contextual (studying in school) relative autonomous motivation.

To attain these goals, we conducted two studies. The first focused on contextual motivation (motivation for studying in school) and assessed the validity of the new projective measure by examining its correlations with four established self-report measures of motivation and emotional experience. The second study focused on situational motivation (participation in a specific extracurricular class). We designed a theory-based experimental manipulation of participants' autonomous motivation and asked whether both—the new projective measure and a self-report scale—are sensitive to motivational differences that are occasioned by the manipulation. As a secondary validity test, we examined the correlations between the projective measure and the customary self-report measure within each experimental condition. Finally, we tested the sensitivity of the new projective measure to an experimentally induced variation in the level of autonomous motivation that is not captured by the self-report scale.

Study 1

Our first study, focusing on children's motivation for studying at school, examined the correlations of the projective indicator of relative autonomous motivation with four well known self-report scales of motivation and affectivity: the index of relative autonomous motivation in the academic domain (based on Ryan and Connell 1989), an affectivity scale (PANAS-C; Laurent et al. 1994, 1999), a scale assessing mastery orientation in the academic domain (Midgley et al. 2000), and a measure of task value (Eccles et al. 1993).

In our attempt to develop and validate a projective measure of relative autonomous motivation, we followed the widely used logic and procedure of first creating indicators of autonomous and controlled motivation and then subtracting the second indicator from the first to produce an indicator of relative autonomous motivation (e.g., Black and Deci 2000; Sheldon et al. 2004; Vansteenkiste et al. 2005a). Relative autonomous motivation in the academic domain as assessed by a projective measure was expected to correlate positively with a self-report measure of relative autonomous academic motivation.

Relative autonomous motivation assessed by a projective measure was expected to correlate positively with positive affect while studying and negatively with negative affect while studying because SDT (Ryan and Deci 2000) assumes that autonomous motivation promotes well being and positive feelings, and reduces ill being and negative feelings (Sheldon et al. 2004).

Relative autonomous motivation assessed by a projective measure was expected to positively correlate with the measure of task value because the task value measure (e.g., Eccles et al. 1993) refers to a construct that is quite similar to two major components of autonomous motivation (identified and intrinsic motivation). In addition, this measure also captures the notion of perceived ability, which according to SDT promotes autonomous motivation.

Finally, relative autonomous motivation assessed by a projective measure was expected to positively correlate with

mastery goal orientation, because mastery goal orientation enhances one's sense of competence (Harackiewicz and Sansone 2000), is frequently found to be associated with intrinsic motivation (Elliot and Harackiewicz 1996; Harackiewicz and Elliot 1993) and is closely related to the notion of autonomous motivation (see: Assor et al. under review).

Method

Participants

Seventy-three Israeli fifth-grade students (42 females, 31 males) from schools in a middle-class neighborhood in southern Israel participated in this study.

Procedure

The study was conducted in the participants' classes during school time. An experimenter entered each class and instructed the children in how to complete the questionnaires. The children were asked to relate to their thoughts and feelings while studying in school. Then they completed the new projective measure and the self-report questionnaires instruments that assessed autonomous-controlled motivation for studying, positive and negative feelings while studying, mastery orientation and task value. To control for possible order effects, the questionnaires were administered in three different orders.

Measures

The projective measure of relative autonomous motivation was created for this study. The participants were presented with three TAT-like pictures. In the first picture, a boy or a girl was lying in bed. The picture was accompanied by the following sentence: "The child in the picture will go to school soon. What does she/he feel? What is she/he thinking?" The second picture portrayed a child and a woman standing near a door. The following sentence appeared under the picture: "The child in the picture is on his/her way to school. What does she/he feel? What is she/he thinking?" In the third picture, the child is walking outside. The verbal statement was: "The child is on her/his way back home from school. What does she/he feel? What is she/he thinking?" Basing ourselves on Deci and Ryan's (1985) conception of relative autonomous motivation, we constructed five indicators of autonomous motivation and five indicators of controlled motivation. The autonomous motivation indicators were (1) a wish to do more of the same activity (e.g., "He feels he wants to go back to school"; "She is thinking of what she will do in school tomorrow"), (2) feelings or actions involving choice (e.g., "He knows he can choose what to study today"), (3) participation motivated by desire (e.g., "She wants to go to school"), (4) interest (e.g., "he was very interested in school today"), and (5) enjoyment (e.g., "She thinks about how much she enjoyed the class"). The controlled-motivation indicators were (1) introjection (e.g., "She feels she has to go; otherwise she will feel bad"), (2) coercion (e.g., "He has to go, they force him to do it"), (3) unwillingness to engage in the activity (e.g., "He feels he doesn't want to go to school"), (4) boredom (e.g., "He thinks of how boring school was today"), and (5) frustration (e.g., "He is frustrated").

Motivation scores were derived from the stories by means of a four-step process. First, for each of the 10 indicators, we counted the number of times in each story in which that indicator appeared. It should be noted that an indictor could appear more than once in a given sentence, hence the total indicator score for a story is equivalent to a literal count of the appearances of the indicator in the story. Second, the count scores of each indicator in the three stories were summed up. This procedure resulted in 5 total indicator scores (across stories) of autonomous motivation and 5 total indicator scores (across stories) of controlled motivation. For example, if story 1 included two expressions reflecting the coercion indicator and story 2 included one expression reflecting coercion, the total score on the coercion indicator was 3. Third, the count scores of the five indicators of autonomous motivation were added up to arrive at a score representing autonomous motivation and a similar procedure was applied to the five indicators of controlled motivation. This procedure then yielded two overall motivation scores: autonomous and controlled. Fourth, consistent with the procedure followed by other researchers using self-report scales (e.g., Black and Deci 2000; Sheldon et al. 2004; Vansteenkiste et al. 2005a), we created a global indicator of relative autonomous motivation by subtracting the score representing controlled motivation from the score representing autonomous motivation.

The number of appearances of each indicator in a participant's stories was tallied by one of two independent judges who are familiar with self-determination theory. The inter-rater correlations for 25 of the subjects were $r = .91$ ($p < .01$) for autonomous motivation and $r = .90$ ($p < .01$) for controlled motivation. A significant negative correlation was found between the projective scores of the autonomous and controlled motivations ($r = -.58$, $p < .001$). This negative correlation suggests that the autonomous and controlled motivation scores indeed lie on opposing poles of the same dimension and therefore can be used to construct a global relative autonomy score.

To control for possible effects of the length of the stories, we counted the number of words across the three stories and used the result as a covariate throughout the analysis. Results showed that story length was positively

correlated with projective autonomous motivation ($r = .31$, $p < .05$) and with projective controlled motivation ($r = .25$, $p < .05$). Relative autonomous motivation was unrelated to story length. This result is probably due to the fact that the relative autonomy score is produced by subtracting the controlled scale from the autonomous scale. The effects of story length were controlled in the analyses appearing in the results section.

The self-reported relative autonomous motivation for studying was assessed by an 11-item Hebrew adaptation of Ryan and Connell's (1989) scale of perceived locus of causality in academic activity. Following the format developed by Ryan and Connell (1989), participants rated on a 1–5 Likert scale the extent to which they agree or disagree with various reasons for their studying in school. Six of the reasons reflected autonomous motivations (intrinsic: "I study in school because it is interesting"; identified: "I study in school because it is important to me"). Five reasons reflected controlled motivations (external: "I study in school because otherwise I will have problems with my parents"; introjected: "I study in school so that my parents will not be ashamed of me").

We created an indicator of autonomous motivation by averaging the scores on the six items pertaining to intrinsic and identified motivation (Cronbach's alpha = .89), and an indicator of controlled motivation by averaging the scores on the five items pertaining to external and introjected motivations (Cronbach's alpha = .65). As expected, the correlation between the two scales was negative and significant ($r = -.35$, $p < .01$). Consistent with the finding of a negative correlation between the controlled- and autonomous-motivation indicators and the procedure used by other researchers (e.g., Black and Deci 2000; Sheldon et al. 2004; Vansteenkiste et al. 2005a), we created a global index of relative autonomous motivation by subtracting the controlled-motivation scale from the autonomous-motivation scale.

The children's affects while studying in school were measured by the version of the PANAS-C developed by Laurent et al. (1994, 1999). This measure is composed of two scales: positive affect (PA) and negative affect (NA). Participants were asked to indicate, on a 5-point Likert type scale, how often they experienced 10 positive-affect (PA) adjectives and 10 negative-affect (NA) adjectives. Summary scores were then computed for the PA and NA scales. $\alpha = .90$ for PA, and $\alpha = .85$ for NA.

Students' task value of studying in school was measured by items translated to Hebrew and modified from questionnaires developed by Eccles and her colleges (Eccles 1984a, b; Eccles et al. 1993; Eccles and Wigfield 1995). Three items assessed students' self-concept of ability and expectations for success in studying in school (e.g., How good are you in studying in school), three items assessed intrinsic value (interest/fun) in studying in school (e.g., How much do you like studying in school?), and three items assessed the importance students ascribe to studying in school (e.g., How useful is what you learn in school for you?). We created an indicator of students' value of learning in school task, by averaging the scores on the nine items pertaining to the task value ($\alpha = .90$).

Students' mastery goal orientation for learning in school was assessed by self-report scale translated from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al. 2000). Four items assessed mastery goals (e.g., I like class work best that I'll learn from even if I make a lot of mistakes) ($\alpha = .89$).

Results and brief discussion

Our preliminary analyses indicated that the order of instrument administration had no effect on the size of the correlations between the projective and the other measures. Table 1 presents means, and standard deviations, of the components of the projective and the various self-report measures.

Table 2 presents the correlations of the global projective measure of relative autonomous motivation and the two components of this projective measure—autonomous and controlled motivation—with the various self-report scales. In computing the correlations, we controlled for the effects of story length by using a partial correlation procedure.

As expected, the projective measure of relative autonomous motivation showed significant positive correlations with the self-report scales of autonomous motivation for studying, positive affect, task value, and mastery orientation. Also as predicted, the projective measure of relative

Table 1 Means and standard deviation of the projective and self-reported measures

	Mean	Standard Deviation
Projective relative autonomous motivation	−3.8	5.0
Projective autonomous motivation	2.1	2.7
Projective controlled motivation	5.9	3.1
Reported relative autonomous motivation	1.6	1.4
Reported autonomous motivation	3.3	1.0
Reported controlled motivation	1.7	.7
Positive affect	3.4	1.1
Negative affect	1.8	.7
Mastery orientation	3.0	1.2
Task Value	3.7	.8
Word count	67.3	38.5

$N = 73$

Table 2 Correlations between the components of the projective and the self-reported measures

	1	2	3	4	5	6	7	8	9	10	11
1. Projective R.A.M	1.00										
2. Projective A.M	.86***	1.00									
3. Projective C.M	−.90***	−.58***	1.00								
4. Reported R.A.M	.45***	.43***	−.37**	1.00							
5. Reported A.M	.43***	.42***	−.36**	.90***	1.00						
6. Reported C.M	−.26*	−.26*	.21*	−.72***	−.35**	1.00					
7. Positive affect	.35**	.27*	−.34**	.54***	.63***	−.16	1.00				
8. Negative affect	−.34**	−.31**	.30**	−.32**	−.22*	.35**	−.19*	1.00			
9. Mastery orientation	.45***	.40***	−.40***	.82***	.86***	−.39**	.60***	−.29*	1.00		
10. Task value	.42***	.37**	−.38**	.78***	.82 ***	−.38**	.62***	−.29*	.84***	1.00	
11. Word count	.00	.31**	.25*	.12	.09	−.11	.15	−.17	.19	.17	1.00

$N = 73$; * $p < .05$, ** $p < .01$, *** $p < .001$ (one tail); RAM = Relative autonomous motivation; AM = Autonomous Motivation; CM = controlled motivation

Note: The coefficients appearing in the first three columns between variables 1–3 and variables 1–10 represent partial correlations with 'word count' as a covariate. Zero order correlations were computed for all the other variables

autonomous motivation showed significant negative correlations with the self-report scales of controlled motivation, and negative affect. Results for the projective measure of autonomous motivation were similar. Finally, as predicted, the projective measure of controlled motivation showed the reverse pattern of associations although weaker. The opposite pattern of correlations for projective autonomous and projective controlled motivation scores suggests that these two components of the projective relative autonomous motivation score are indeed located on the opposite poles of the same dimension.

Examination of the correlations of projective relative autonomous motivation with other indicators versus the correlations of the components of this composite score with other indicators consistently shows that the composite measure has somewhat higher correlations. This pattern, together with the fact that the components of the projective relative autonomous score appear to lie on the same dimension, suggests that it may be better to use the more global projective relative autonomous motivation score than its components.

As expected, the measure of self-reported relative autonomous motivation and its two components showed a correlation pattern that, in terms of directionality (positive or negative correlations), is identical with the parallel projective measures. However, the correlations of self-reported relative autonomous motivation and self-reported autonomous motivation with mastery and task value, and to some extent also with positive affect, were more sizable than the correlations of the parallel projective measures with those variables. This pattern might be due to both shared method variance and overlapping content.

Finally, the correlations between the self-report scales assessing task value, mastery orientation, and autonomous motivation are rather high. These correlations suggest that the three scales assess very similar motivational dispositions (see Murphy and Alexander 2000, on this issue). Thus, it appears that theorists and researches need to deal with the issue of integrating these constructs or alternatively develop more sensitive and discriminating self-report measures. However, for the purpose of validating the new projective measure of autonomous motivation, the high correlations are not problematic because all three constructs share elements referring to the perception that one does things because one truly understands and feels their value (i.e., autonomous motivation).

The findings of Study 1 suggest that the new projective measure captures contextual differences in autonomous and controlled motivation. Study 2 asked whether the new projective measure is also sensitive to situational variations in relative autonomous motivation that are generated by specific events or situations to which are children are exposed.

Study 2

To develop and validate our projective measure, we followed McClelland's tradition in constructing measures of the achievement, affiliation, power, and intimacy motives (e.g., McClelland 1989; McAdams 1991, 1992). Accordingly, we designed a theory-based experimental manipulation of participants' autonomous motivation. As a manipulation check, we asked whether the self-report indicator of relative autonomous motivation (based on Ryan and Connell [1989] and used in Study 1) shows that participants in the condition assumed to arouse autonomous motivation indeed reported a higher level of this type

of motivation than participants in a condition designed to undermine autonomous motivation. Then we asked whether our new projective measure is also sensitive to the experiment-induced variation in the level of autonomous motivation. As a secondary test of the validity of our projective measure, we examined the correlations between the projective measure and the self-report measure within each experimental condition.

To affect the students' level of autonomous motivation, we offered them an extracurricular class that is either consistent with or contradictory to their interests. On the basis of SDT (Ryan and Deci 2000; Deci 1992), we reasoned that the participants would feel autonomously motivated to participate in a class that would give them an opportunity to realize their interests, and that having to take a class that clashes with their interests would undermine their autonomous motivation to participate in this class. As a result, autonomous motivation would be stronger in the interest-consistent condition and both the new projective measure and the self-report instrument would detect the difference. We also expected the two indicators of autonomous motivation to take the extracurricular class to be positively associated within each experimental condition. In this design, participants' autonomous motivation was assessed in relation to a wide variety of extracurricular classes in domains such as music, sports, drama, and computers. This allowed us to examine the applicability of the new projective method as an indicator of situational autonomous motivation. Finally, we tested the sensitivity of the new projective measure to an experimentally induced variation in the level of autonomous motivation that is not captured by the self-report scale. A finding in this matter might suggest that the projective measure taps aspects of the experience of autonomous motivation that are not captured by self-report scales and that, therefore, use of both instruments would yield a richer and more complete assessment of the experience of autonomous motivation.

Method

Participants

Eighty-four Israeli seventh-grade students, (45 females, 39 males) from four schools in middle-class neighborhoods in southern Israel participated in this study.[2]

[2] The data for this study were collected in the context of a larger project. None of the relationships reported in this study has been reported previously.

Procedure

The experiment was performed in two sessions that took place in the participants' classrooms. In the first session, participants completed a questionnaire designed to identify topics that they like and are highly interested in, as well as topics that they do not like and are not interested in. In the next session, held several weeks later, each participant received a form indicating that he or she had been assigned to a specific extracurricular class that would be held during school time. In the second session, we manipulated the participants' autonomous motivation to take the extracurricular classes by randomly assigning them to two conditions: autonomy-supportive and autonomy-suppressive. All participants were told what class they were assigned to. For the participants in the condition designed to support autonomous motivation, the class focused on a topic congruent with the topic that they had indicated in the first meeting as the most interesting to them. For the participants in the condition designed to suppress autonomy, the class focused on a topic that was incongruent with their interest—one that they had defined in the first meeting as not interesting. After receiving notification about the extracurricular class that had been chosen for them, the students completed the new projective instrument and a self-report scale assessing their autonomous motivation to take the class.

Measures

The pictures used in the projective measure of relative autonomous motivation were identical to those used in the first study. The sentences accompanying the pictures, however, focused on feelings and thoughts about the extracurricular class to which the participants had been assigned. For example, the sentence accompanying the first TAT-like pictures was, "The child in the picture will go to his extracurricular class soon. What does she/he feel? What is she/he thinking?" As in the first study, the number of autonomous and controlled indicators appearing in the three stories was counted and then summed up to produce separate autonomous- and controlled- motivation projective scores. The result replicated the pattern obtained in Study 1: a significant negative correlation between the autonomous- and controlled-motivation projective scores ($r = -.45$, $p < .001$). A projective indicator of relative autonomous motivation was produced by subtracting the projective controlled-motivation score from the projective autonomous-motivation score.

We used the same measure as in Study 1 to assess self-reported relative autonomous motivation for studying. As in the case of the projective instrument, however, the items focused on reasons for participation in the extracurricular

class to which the participants had been assigned. A scale that assessed self-reported autonomous motivation was created by averaging the scores on the six items pertaining to intrinsic and identified motivations (Cronbach's alpha = .94) and a scale assessing controlled motivations was created by averaging the scores on the five items pertaining to external and introjected motivations (Cronbach's alpha = .68). The correlation between the two scales was negative and significant ($r = -.39$, $p < .01$). As in Study 1, a global indicator of relative autonomous motivation was constructed by subtracting the controlled-motivation scale from the autonomous-motivation scale.

Results

The primary test of the validity of the new projective measure of autonomous motivation was based on a comparison of scores obtained for this measure in the condition designed to enhance autonomous motivation (interest-supportive) relative to the condition designed to undermine autonomous motivation (interest-suppressive). This test, of course, relies on the assumption that the manipulation affected the participants' autonomous motivation. To examine this assumption, we first conducted a manipulation check by examining the effect of the manipulation on the self-report indicator of autonomous motivation.

The results supported the validity of the manipulation ($F(1, 82) = 27.95$, $p < .001$). As expected, participants who had been assigned to the condition designed to enhance autonomous motivation (interest support) reported higher levels of autonomous motivation ($M = 2.31$, SD = 1.42) than participants who had been assigned to the condition designed to undermine autonomous motivation (interest-suppressive) ($M = .54$, SD = 1.25).

After having validated the manipulation that had been designed to affect autonomous motivation, we asked whether the new projective measure would indeed detect the higher level of autonomous motivation that the participants in the interest-support condition were likely to experience.

To assess possible effects of story length, we counted the number of words that each participant wrote ($M = 85$, SD = 50.3). The correlations between story length and the three projective motivation scores were: $r = .23$ ($p < .05$) for autonomous motivation, $r = .047$ (n.s.) for controlled motivation and $r = -.080$ (n.s.) for relative autonomous motivation. Story length was entered as a covariate in a one-way ANCOVA. The results indicate a significant difference between the two conditions in the new projective measure of autonomous motivation ($F(1, 81) = 6.60$, $p < .05$). As expected, participants who had been assigned to a class that was congruent with their interest showed a higher level of autonomous motivation ($M = 1.23$, SD = 3.84) than participants who had been assigned to a class incongruent with their interest ($M = -.94$, SD = 5.31). No significant effect was found for story length ($F(1, 81) = .03$, n.s.). Figure 1 presents the effect of the attempt to induce autonomous versus controlled motivation (interest support versus interest suppression) on both the self-report and the projective measures.

As a secondary test of the validity of the new projective measure, we examined the correlation, within each experimental condition, between the projective measure of autonomous motivation and the more established self-report measure. The Pearson product moment correlations between the two measures were .51 in the interest-supportive condition and .45 in the interest-suppressive condition. Both coefficients were significant at the $p < .01$ level. Theses correlations clearly support the concurrent validity of the new projective measure.

Finally, we used a regression analysis to test the sensitivity of the new projective measure to an experiment-induced variation in level of autonomous motivation that is not captured by the self-report scale. The predictors in this analysis were participants' exposure to an autonomy-supportive versus an autonomy-suppressive condition and their score on the self-report index of autonomous motivation. The dependent variable was the participants' score on the projective measure. The results indicated that exposure to an autonomy-supportive experimental condition (as against an autonomy-suppressing condition) and self-reported motivation had a significant effect on the projective indicator of relative autonomous motivation ($F(2, 81) = 35.20$, $p < .001$, $R^2 = .452$). More importantly, the experimental induction of autonomous motivation had a unique positive effect on the projective indicator of relative autonomous

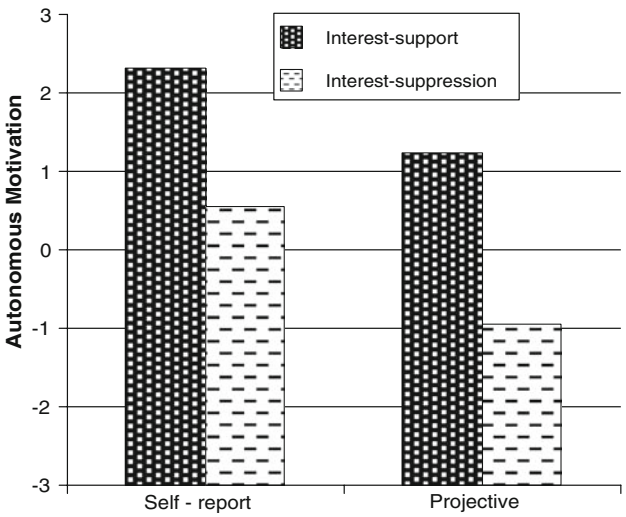

Fig. 1 Effect of the attempt to induce autonomous versus controlled motivation on autonomous motivation as assessed by self-report and projective measures

motivation even when relations with self-reported relative autonomous motivation were controlled for ($\beta = .31$ $p < .01$). This suggests that the projective measure of autonomous motivation is sensitive to aspects of experiment-induced autonomous motivations that are not captured by the self-report measure.

Although it was not our main focus, we also examined whether the self-report measure was sensitive to an aspect of the experiment-induced autonomous motivation that was not captured by the projective measure. To explore this question, we conducted a regression analysis in which the participants' score on the self-report index of autonomous motivation was regressed onto participants' exposure to an autonomy-supportive versus suppressive condition and participants' score on the projective measure. The results of the regression analysis ($F(2, 81) = 38.89$, $p < .001$, $R^2 = .456$) yielded a significant unique effect for exposure to an autonomy-supportive versus –suppressive condition ($\beta = .29$ $p < .01$) and for the score on the projective measure ($\beta = .47$ $p < .001$). The fact that the projective measure of motivation did not explain all the variance in self-reported autonomous motivation suggests that, although the two measures assess some common aspects of autonomous motivation, each measure captures a unique quality of autonomous motivation that eludes the other.

General discussion

The results of the two studies suggest that children's autonomous motivation to participate in various activities can be validly measured by a TAT-like projective measure. The findings of Study 1 show that the projective measure captures differences in children's relative autonomous motivation for studying, as indicated by widely accepted self-report measures of motivation and affect. Study 2 lends the projective measure further validity by providing experimental evidence of its sensitivity to variations in relative autonomous motivation generated by specific autonomy-enhancing or autonomy-suppressing events to which children are exposed in various domains other than studying in school.

The finding that the experimental manipulation had a unique effect on the projective measure (controlling for the effect of the self-report scale) indicates that the projective measure is sensitive to an experiment-induced variation in level of autonomous motivation that the self-report scale does not capture. It was also found that the self-report scale is sensitive to experiment-induced variation in the level of autonomous motivation that the projective measure fails to capture. The findings of the regression analysis then illustrate the potential value of using a projective measure in addition to self-report in future research on autonomous motivation. Moreover, it appears that the use of both types of instruments may yield a richer and more complete assessment of the experience of motivation than the use of only one method of assessment (e.g., Sokolowski et al. 2000).

An interesting and perhaps surprising finding in the present study is the set of significant and moderate correlations between the projective and self-report measures of autonomous motivation within each condition. While some studies that examine relations between TAT-based projective measures of motivation and self-report scales report positive associations (Emmons and McAdams 1991; Barends et al. 1990), most research in this area does not detect such associations (e.g., Koestner et al. 1991; Woike 1992; King 1995). The lack of an association between projective and self-report motivational indicators prompted McClelland et al. (1989) to propose that the two types of measures capture separate motivational systems. Specifically, they suggested that self-report questionnaires tap self-attributed motives that are effective in predicting deliberate choices and respondent behavior, while projective methods are more likely to capture implicit motives that are effective in predicting spontaneous behavior patterns.

The moderate correlations that our study found between the projective and the self-report indicators do not support the idea of highly separate motivational systems. However, the regression-based finding that the projective measure is sensitive to aspects of the experimental motivational induction that are not captured by the self-report scale is consistent with the idea that projective measures do tap a motivational system that is at least partly distinct from the system captured by self-report scales.

Thrash and Elliot (2002) also address the issue of correspondence between projective and self-report measures of achievement motivation. The question of whether the two types of motive measures are related, they say, is less important than the need to know when or under what conditions they may be related. They also suggest that the degree of concordance between the two types of measures may vary as a function of (1) the substance of motive constructs (including valence and domain) (2) methodological factors such as the validity and comparability of the instruments selected (3) substantive differences or contextual variables that moderate the degree of motive concordance.

Consistent with the considerations outlined by Thrash and Elliot (2002), it appears that the projective and self-report measures examined in this study show an unusually high concordance relative to other studies for two reasons. First, we focused on a different motivational domain than most other studies, i.e., autonomous motivation. Second, we examined responses to a situational arousal of motivation rather than enduring motive dispositions. Future research will have to determine whether a similar

concordance will occur in studies focusing on enduring dispositions with regard to autonomous motivation.

The development of a projective assessment of autonomous motivation is important not only for better understanding of motivational systems and processes but also because it can enhance our ability to assess autonomous motivation in contexts where questionnaires cannot be used effectively. Self-report questionnaires may yield valid (or at least partly valid) responses when participants have at least some degree of psychological awareness and are not concerned about impression-management and social-desirability issues. The condition of satisfactory psychological awareness is, of course, less likely to be met in the case of young children (e.g., Assor and Connell 1992; Assor et al. 1990a, b). The condition of being able to overcome impression-management and social-desirability concerns is less likely to be satisfied in the case of collectivist cultures, in which social image and compliance with social expectations are of paramount importance (e.g., Doi 1986.). It appears, then, that the development of a projective measure of autonomous motivation is particularly important in research involving young children and with some adaptations might also be suitable for older people from highly collectivist cultures. Future research may determine whether the projective measure developed in the present study can be applied to those populations.

Acknowledgement This study was supported by a grant from the Israel Science Foundation to the second author.

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