

Interest as a motivational resource: Feedback and gender matter, but interest makes the difference

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Abstract. This study tested the hypothesis that interest in a certain topic enables children to sustain their intrinsic motivation in topic-related tasks when positive feedback is absent. Ninety-one Israeli children in the seventh grade completed a questionnaire assessing their interest in the topic of logic questions. Later, in individual sessions, children worked on logic questions, and either received positive feedback or no feedback on their performance. Then, they completed a questionnaire assessing their intrinsic motivation to participate in a similar task. As expected, children with a high level of interest reported more intrinsic motivation than did children not high on interest. Among children with moderate interest, absence of positive feedback was associated with decreased intrinsic motivation for boys, and increased motivation for girls. This gender-related pattern was interpreted as suggesting that girls with moderate interest perceived the positive feedback as an attempt to control them. The findings support the view that interest may serve as a personal resource that helps children to cope with non-optimal learning conditions.

Key words: Interest, feedback, intrinsic motivation, Gender differences.

1. Introduction

The concept of interest has received considerable attention in motivational research during the past 15 years (e.g., Renninger, 1992; Hidi & Berndroff, 1998; Ainley, Hillman, & Hidi, 2002; Renninger, Ewen, & Lasher, 2002). Interest researchers distinguish between an individual (dispositional) and a situational type of interest (see Renninger, 2000 for a review). They posit that the interest in a certain topic, subject or domain, promotes a variety of desirable outcomes in children (e.g., Hidi, Renninger, & Krapp, 2004). For example, it was found that interest predicted deeper processing and better memory for texts (Hidi, 1990) and levels of learning (Alexander, 1997; Alexander & Murphy, 1998; Schiefele, 1999; Renninger, Ewan, & Lasher, 2002; Reninger & Hidi, 2002). Interest was found to be associated with persistence and effort investment in interest-related tasks

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(Prenzel, 1992; Renninger & Hidi, 2002), self perceived ability in interest-related subjects (Hannover, 1998), and motivation to learn (Schiefele, 2001). More generally, interest was assumed to contribute to the development of a sense of meaning, identity and autonomy (Assor, 2004; Aviram, 1999).

One potential benefit of interest that was hardly examined, yet is likely to be quite meaningful in educational settings, is the potential function of interest as a *coping resource* or a buffering factor that helps children cope with unfavorable learning conditions (for studies treating interest as a resource see: Sansone, Weir, Harster, & Morgan, 1992; Silvia, 2001). Thus, it is reasonable to assume that because children value and enjoy working on certain topics, they would be willing to tolerate, at least for a while, non-optimal, perhaps even frustrating, learning conditions.

1.1. INTEREST AS A RESOURCE THAT SUSTAINS INTRINSIC MOTIVATION WHEN FREQUENT POSITIVE FEEDBACK IS MISSING

One component of learning contexts that was found to undermine children's intrinsic motivation (and can be viewed as contributing to a non optimal learning environment) is the absence (versus presence) of positive performance-contingent feedback. According to Self Determination Theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000), interpersonal events and structures that are conducive to feelings of competence during a certain action can enhance intrinsic motivation for that action, whereas structures that do not support people's need for competence undermine intrinsic motivation. Accordingly, situations in which people are not provided with positive performance-contingent feedback are assumed to undermine intrinsic motivation because they do not allow people to receive the type of information that they need to feel competent and effective (White, 1959; Deci, Koestner, & Ryan, 1999). In contrast, positive performance feedback is assumed to support people's need for competence, which then enhances their intrinsic motivation to engage and re-engage with the task.

The SDT further specifies that feelings of competence would not enhance intrinsic motivation unless they are accompanied by a sense of autonomy (Ryan & Deci, 2000; Assor & Kaplan, 2001). Thus, it is important that the feedback would be given in ways that are informational and not controlling. Research conducted within the framework of SDT has generally supported that claim, indicating that positive performance-contingent feedback that is administered in an informational way generally enhances intrinsic motivation, whereas absence of such feedback undermines intrinsic motivation (e.g., Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Deci & Ryan, 1985; Deci et al., 1999; Vansteenkiste & Deci, 2003).

The importance of positive performance feedback was recognized also by researchers adopting theoretical perspectives other than SDT. For example, in Bandura's self efficacy theory (Bandura, 1997), information pertaining to

performance outcomes is conceived as an important source of perceived efficacy, which in turn serves as a major determinant of motivation (Bandura & Schunk, 1981; Zimmerman, 2000; Bandura & Locke, 2003).

Although positive performance-contingent feedback can be an important determinant of intrinsic motivation, teachers in crowded classrooms might find it difficult to provide their students with such feedback (see Brophy, 1981 on the low-frequency of feedback provision in classrooms). Moreover, demands of administrators and comparative achievement tests might lead teachers to cover a great deal of “material” quickly, an approach that further reduces teachers’ capacity to provide frequent and specific performance feedback.

Given the potentially negative effects of lack of performance feedback on children’s intrinsic motivation, it appears important to identify personal dispositions that, if cultivated in students, might act as personal coping resources that allow students to sustain intrinsic motivation in contexts where positive performance-contingent feedback is not provided frequently. In view of the many educational benefits associated with interest (e.g., Krapp, 2002; Renninger & Hidi, 2002), we posited that interest might constitute one such personal resource.

Interest has been conceptualized in variety of ways (Hidi, 2000; Renninger, 2000; Krapp, 2002). As can be expected, the different conceptualizations have resulted in various methods of assessing students’ interest (Pintrich & Schunk, 2002). The present study focused on a type of interest that, following Wigfield and Eccles, (1992) can be termed “intrinsic interest”.

Intrinsic interest or intrinsic value was defined as “the enjoyment people experience when doing a task, or their subjective interest in the content of the task” (Wigfield & Eccles, 1992, pp. 280). This type of interest is conceptually similar to the way self determination theorists conceptualize interest, viewing it as closely linked to intrinsic motivation (Deci & Ryan, 1985; Deci, 1992), as well as to the definition of flow presented by Csikszentmihalyi (1975). Intrinsic interest in a topic is close to what Hoffman (2002) has described as “subject-related interest” and Hidi and McLaren (1990) and Shiefele (1996) termed “topic interest”. However, we focused only on the emotional aspects of interest.

The phenomenon of intrinsic interest appears to represent a less developed form of interest, because it is not necessarily accompanied by a great deal of knowledge, valuing or actual experience and engagement with the topic. And, as suggested by major researchers in the area of interest, well developed interests do have such characteristics (e.g., Renninger, 1992; Krapp, 2002; Hidi, 1992). Thus, we have decided to focus on a rather rudimentary type of interest, one that represents what may be termed initial attraction rather than a fully developed form of interest (see Hidi, Renninger, & Krapp, 2004).

We focused on this type of interest because it allowed us to conduct what appears to be a rather stringent and a particularly interesting test of our hypothesis that any type of interest, even a rudimentary one, can serve as a buffering factor that helps children cope with unfavorable learning conditions. If this rather minimal type of interest would be found to help children cope with unfavorable learning conditions, then it is reasonable to assume that more developed forms of interest would also be helpful.

Intrinsic interest may enable children to remain occupied in a task without receiving immediate feedback because it can allow them to perceive the task as enjoyable and as containing personally meaningful information, which they can connect with various issues that interest them. In addition, children who have an interest in a certain topic, might be able to rely on internal cues as to how well they are doing due to their experience with similar tasks (see Harter, 1981a,b; Flink, Boggiano, Main, Barrett, & Katz, 1992). We therefore hypothesized that intrinsic interest would contribute to intrinsic motivation in a topic-related task in both no-feedback and positive feedback conditions.

But interest may not be the only factor that influences children's intrinsic motivation in response to various feedback conditions. Another factor that might affect children's responses to absence versus presence of positive performance feedback is children's gender. In the following section we focus on gender related responses to feedback and then proceed to discuss the ways in which interest may interact with gender to affect children's responses to absence of positive feedback.

1.2. GENDER DIFFERENCES IN REACTION TO FEEDBACK

Deci (1975) has suggested that males and females often react differently to praise from another person. According to his proposal, when males are told by other people that their performance is superior, they often perceive it as an informational message indicating that they are competent at the relevant task. The increased sense of competence is then assumed to enhance males' intrinsic motivation. In contrast, females often experience praise indicating superior performance as a controlling external intervention which diminishes their sense of autonomy, and consequently also undermines their intrinsic motivation.

According to Deci (1975) males tend to be more sensitive to the informational aspect of praise because their socialization has oriented them toward independent achievement. In contrast, females tend to be more sensitive to the controlling aspect of praise because their socialization has oriented them to be more interpersonally sensitive and more concerned with others' evaluations of them.

An additional potential cause for boys' stronger tendency to interpret praise as an indicator of competence (and therefore as more intrinsically

motivating) is that teachers' praise may be more closely linked to children's actual performance in the case of boys than in the case of girls. Thus, Parsons, Kaczala, and Meece (1982) and Dweck, Davidson, Nelson and Enna (1978) reported that teachers' praise was much more related to quality of intellectual performance for boys than for girls.

Most of the research designed specifically to test the hypothesis concerning gender differences in reaction to praise has supported this notion (e.g., Deci, Cascio & Krusell, 1975; Kast & Connor, 1988; Koestner, Zukerman, & Koestner, 1989; Zinser Young, & King, 1982, but see also the negative results reported by Blank, Reis, & Jackson, 1984).

The present, study, unlike the studies aimed at testing the gender differences' hypothesis formulated by Deci (1975), focuses on positive performance feedback rather than on praise. Henderlong and Lepper (2002), in their comprehensive review of research on praise, distinguish between praise and positive performance feedback, and state that praise, unlike positive performance feedback, includes a message by another person implying that one's products, performances or attributes are worthy of a positive evaluation relative to some valid standards of assessment (e.g., "Good, that is the quickest that one has been done").

Positive performance feedback merely includes information about the correctness of one's solution (e.g., you solved 90% of the problems correctly), and unlike praise, it does not include positive evaluative statements from another person that strengthen the merit of the outcomes obtained by the actor, or tie those results to some worthy trait or behavior of the actor. Following the above distinction, Mueller and Dweck (1998) used positive performance feedback as a neutral condition against which various types of praise were compared.

Because positive feedback does not include a strong evaluative message from another person, it is not clear if this type of feedback would trigger differential gender-related responses similar to those observed in the case of praise. As empirical studies of this issue are scarce, the present study sought to examine gender-related effects of presence versus absence of positive feedback on children's intrinsic motivation. Given our focus on interest as an important determinant of motivation, we also explored the potential role of interest as a moderator of gender-related responses to presence versus absence of positive feedback.

Consistent with the notion of interest as a coping resource, it can be assumed that children with high interest would not show differential gender-related responses to positive feedback because, for them, interest serves as a buffering factor that enables those boys and girls to tolerate the inconvenience generated by various types of feedback conditions. Therefore, we predicted that girls and boys with a great deal of interest would experience high levels of intrinsic motivation irrespective of whether they receive positive feedback or not.

With regard to children who have not developed high levels of interest, we expected that since boys tend to interpret positive evaluative messages as conveying competence information, they would view the message that they have solved a problem correctly as evidence for their competence, whereas absence of positive feedback would frustrate their need to receive information concerning their competence at the relevant task. Therefore, we hypothesized that among boys with low or moderate levels of interest, absence (as compared to presence) of positive performance feedback would be associated with decreased intrinsic motivation.

As for girls, being less achievement oriented, they might be less inclined to look for feedback that informs them concerning their competence, and when they receive positive feedback, they might be less inclined than males to interpret it as providing competence information. Consequently, we predicted that among children with low or moderate levels of interest, absence of positive performance-contingent feedback would have less negative effects on intrinsic motivation in girls than in boys.

1.3. THE PRESENT STUDY

The present study used an experimental design to study potential benefits of interest. Children's interest in the topic of logic puzzles was assessed in one session, and about one week later, they worked on unfamiliar puzzles involving decision making problems. After they completed their work, participants either received positive performance feedback, or did not receive any feedback. Then, their intrinsic motivation for participation in similar tasks was assessed.

In our definition and measurement of interest we have followed the concept of "intrinsic interest" (Wigfield & Eccles, 1992) and Deci's (1998) view of interest as a precursor of intrinsic motivation. Therefore, we emphasized the interest and enjoyment components of this disposition more than the knowledge or value components that are part of the definition of a well developed individual interest (Renninger, 1990, 2000). It is quite possible that the strong emphasis on interest and enjoyment might cause us to capture a type of interest that is somewhat less developed and perhaps even less enduring. However, it is important to discover whether even a less developed type of interest enables children to develop intrinsic motivation in non-optimal learning situations.

One advantage of the use of logic puzzles was that a great deal of research on intrinsic motivation and on gender differences in reaction to positive evaluative feedback was done on puzzles of various types (Deci, 1975; Harackiewicz, 1979; Sansone, 1986; Kast & Connor, 1988; Mueller & Dweck, 1998; Henderlong & Lepper, 2000). The similarity in the type of tasks chosen to assess intrinsic motivation allows us to relate our results to findings obtained in previous research, and in particular to research where

gender effects were not obtained, perhaps due to lack of consideration of the moderating role of interest.

Based on the foregoing considerations, we hypothesized that children with high levels of interest would show a great deal of intrinsic motivation to work on tasks that are similar to the decision making puzzles they have just solved, and this preference for similar tasks would be manifested irrespective of children's gender or of whether they get feedback or not. As for children whose interest is not high, they were expected to show lower levels of intrinsic motivation, as well as to exhibit differential, gender related responses to absence versus presence of positive feedback, so that absence of positive feedback would undermine motivation in boys more than in girls.

2. Method

2.1. PARTICIPANTS

Participants were 91 seventh grade Israeli children (43 boys and 48 girls) from two schools in middle class neighborhoods in the southern part of Israel.

2.2. PROCEDURE

The study consisted of two sessions. In the first session, participants completed, in their classrooms, a self-report questionnaire assessing interest in the topic of logic questions, puzzles and thinking games. The second session was held individually 1 week later. An adult experimenter gave each student a set of ten multi-attribute decision-making questions in which one is provided with several criteria for choosing various products and is then asked to select the product that represents the best choice. Each question had only one correct answer. A detailed description of the questions used appears in Bereby-Meyer, Assor, and Katz (2004).

After completing the questions, participants were exposed to one out of two experimental conditions:

Positive feedback: The researcher told the participant: "Most of your answers are correct, thank you very much for your participation".

No feedback: The researcher told the participant: "Thank you very much for your participation".

Participants were assigned to the manipulation conditions randomly. Post experiment questioning indicated that none of the participants questioned the credibility of the bogus positive feedback. This was not surprising because the questions were new and not trivial, making it very difficult for participants to determine whether they solved them correctly.

After participants received the positive feedback or the no feedback treatments, they completed a self-report questionnaire assessing their intrinsic motivation for participation in similar tasks in the future.

2.3. INSTRUMENTS

2.3.1. *Interest Questionnaire*

This instrument consists of five items assessing the participants' interest in and enjoyment of riddles and thinking games. Examples of items: "I like to work on riddles that you have to work hard to solve", "I enjoy participating in thinking games at class even if I don't receive any rewards". Participants were asked to indicate the degree to which they agree with each statement using a 5-point Likert scale (1 = do not agree, 5 = absolutely agree). Cronbach Alpha was 0.88.

2.3.2. *Intrinsic Motivation for Working on Similar Tasks*

This variable consists of four items assessing participants' intrinsic motivation for working in the future on problems similar to the decision questions they have just finished solving. Examples of items: "If there would be another meeting, I would want to get questions of this type again", "I like to work on questions of this type", "I would like to have assignments similar to these questions in our regular classes". Participants indicated the extent to which they agree with each item using a 5-point Likert scale (1 = not at all, 5 = very much). Cronbach Alpha was 0.85.

2.3.3. *Actual Score on the Multi-attribute Problem*

The number of questions that children solved correctly constituted their actual score. In the various analyses, actual score was added as a covariate in order to control for the possibility that the results might be affected by children's actual performance rather than the two factors examined in this study. It should be noted that, as can be expected in the case of random assignment, children's actual score and the type of feedback they received were unrelated.

3. Results

We hypothesized that children with high levels of interest would show a great deal of intrinsic motivation to engage in puzzles that are similar to those they have just worked on, and this preference would be manifested irrespective of children's gender or the type of feedback they received. In contrast, children whose interest is not high were expected to show lower levels of intrinsic motivation, as well as to exhibit differential, gender related responses to absence versus presence of positive feedback.

The hypotheses were tested by means of a $3 \times 2 \times 2$ Analysis of Covariance (ANCOVA), which was then followed by tests examining our specific predictions. The ANCOVA examined the effects of three between-subjects' factors: interest (low, moderate, and high), type of feedback (positive feedback versus no feedback), and gender. The dependent measure was intrinsic motivation to participate in similar tasks, and the covariate was children's actual score on the puzzles. The three levels of interest were determined based on tri-modal splits of participants' scores, which were performed separately for girls and boys.

As expected, results of the ANCOVA showed a significant main effect of interest [$F(2, 77) = 23.33, p < 0.001, \eta^2 = 0.34$]. A simple effect test [$F(1, 77) = 32.37, p < 0.001$] then supported the prediction that children with high interest would describe themselves as more intrinsically motivated with regard to the decision-making puzzles ($M = 4.78, SD = 0.32$) than would children who are not high on interest (Moderate: $M = 4.05, SD = 0.98$; Low: $M = 3.67, SD = 0.85$).

In addition to the main effect of interest, the only other significant effect detected by the ANCOVA was a three way interaction involving gender, interest and type of feedback [$F(2, 77) = 3.67, p < 0.005, \eta^2 = 0.05$].

This interaction was expected based on the hypothesis that children whose interest is low or moderate, but not high, would show differential, gender related, responses to absence versus presence of positive feedback, so that absence of positive feedback would undermine motivation in boys more than in girls. To examine if the pattern of the three way interaction is, indeed, consistent with the above hypothesis we performed three two-way ANCOVAs (one for each level of interest). The patterns of those interactions are presented in Figure 1.

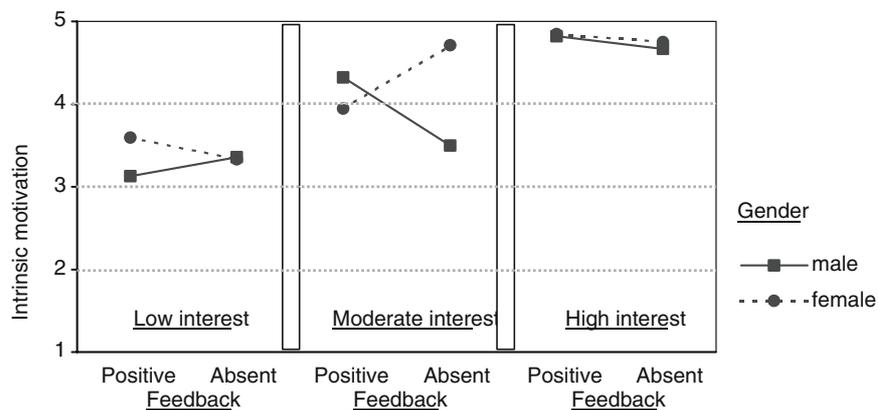


Figure 1. The effects of feedback and gender on intrinsic motivation at three levels of interest.

Results were consistent with our predictions in two out of the three ANCOVAs. Thus, as expected, the gender by type of feedback interaction was significant for participants with moderate interest [$F(1, 77) = 8.61, p < 0.005$], but not for participants with high interest [$F(1, 77) = 0.22, \text{N.S.}$]. Unexpectedly, the gender by type of feedback interaction was not significant for participants with low interest [$F(1, 77) = 0.63, \text{N.S.}$].

The pattern of the interaction among participants with a moderate level of interest indicates that, as expected, the absence of positive feedback undermined intrinsic motivation in boys much more than in girls. Thus, a simple effects tests indicated that boys who received no feedback ($M = 3.50, SD = 1.20$) showed significantly lower intrinsic motivation than boys who received positive feedback ($M = 4.32, SD = 0.53$) [$F(1, 77) = 4.85, p < 0.05$]. Unexpectedly, for girls, absence of positive feedback ($M = 4.71, SD = 0.42$) tended to enhance intrinsic motivation (Positive feedback: $M = 3.94, SD = 1.02$) [$F(1, 77) = 3.76, p < 0.06$].

Overall, the results show that children with a high level of interest experienced more intrinsic motivation to participate in similar tasks than did children who are not high on interest, and the positive effect of high interest was detected also when children received no positive feedback, and irrespective of children's gender. In addition, we have found that, among children with moderate, but not low or high, interest, absence of positive feedback was associated with decreased intrinsic motivation in boys, and increased motivation in girls.

4. Discussion

The results of the present study suggest that interest can serve as a resource that enables children to cope with non-optimal learning conditions. Thus, it appears that high interest can help children to overcome the potentially harmful effects of lack of positive feedback, and makes them less susceptible to negative, gender-related, influences of various types of feedback conditions.

The findings also indicate that presence of positive feedback has a positive impact on intrinsic motivation among boys with a moderate level of interest and a negative impact on the intrinsic motivation of girls with moderate level of interest. Among high or low interest participants, presence of positive feedback did not have significantly different effects on boys and girls. The finding that variations in feedback conditions had differential gender related effects only among children with moderate interest might be explained by empirical and theoretical work conducted within the domain of attitude change. Thus, it is possible that children reporting a moderate degree of interest are less certain of their interest than those reporting high or low-levels of interest, and this uncertainty enhances their susceptibility to the influence of available information.

The notion that a moderate level of endorsement of a certain attitude often reflects a lower level of certainty in one's attitude is consistent with results of research indicating that people with moderate (i.e., non-extreme) attitudes take more time to make attitude-related judgments than people with more extreme attitudes (see Fazio, 1990). In addition, research described by Kelly and Lamb (1957) and Turner (1993) suggests that uncertainty or ambiguity concerning one's attitudes makes one more susceptible to external, attitude-related, messages.

As for low interest participants, they may enter the task with a negative attitude that causes them to discard any input that might reflect on their competence or the value of the task, and therefore variations in feedback conditions do not have a significant effect on them. Further research may examine whether differential gender-related effects continue to emerge most strongly among children with moderate interest. To the extent that this pattern is replicated, research may examine various explanations of this phenomenon.

The results obtained for girls with moderate interest were somewhat unexpected. Although we did hypothesize that girls would react less negatively than boys to absence of positive feedback, we did not expect them to react to positive feedback more negatively than to absence of feedback. We did not predict the negative impact of positive feedback on girls because we assumed that the feedback we gave is not likely to be experienced as interpersonally and controlling. Thus, the person giving the rather minimal and objective message that constituted the positive feedback did not add to it a personal statement of evaluation, which could be construed as an act of inter-personal pressure or as an influence attempt. Yet, the fact that the girls with moderate interest did react negatively to this type of feedback might indicate that those girls did interpret this feedback as controlling, just as the females in the studies on praise (e.g., Deci et al., 1975; Kast & Connor, 1988) interpreted praise as controlling.

The findings concerning the negative effect of feedback for girls with moderate interest suggest that positive feedback is not necessarily beneficial for everyone. This conclusion is further reinforced by the fact that, overall, presence of positive feedback did not enhance intrinsic motivation relative to no feedback (i.e., positive feedback did not have a main effect on motivation). Thus, it appears that the desirable effects of positive feedback cannot be taken for granted, and they depend on the persons receiving the feedback (e.g., their gender and level of interest), and on the context. In this respect, then, positive feedback is not that different from praise, whose impact on people clearly depends on a variety of contextual and personal factors (see Henderlong & Lepper, 2002).

The results of the present study suggest that interest might be a valuable coping resource. In future research, it would be interesting to articulate and study the mediating processes through which interest may act as a buffering

protective factor that supports intrinsic motivation in non-optimal learning environments.

One possibility is that students with a high level of interest have more developed schemas or strategies for coping with various types of problems in their domain of interest (Renninger, Ewan, & Lesher, 2002; Schiefele, 1999, 2001), and those internal structures provide them with internal cues suggesting that they are on the right path when external, competence-supporting, feedback is missing. Thus, relative to low-interest children, high-interest children might have more developed and systematic schemas which give them a greater sense of predictability and efficacy in situations where external feedback is unavailable. Future research might examine this account as well as other possible mechanisms that might explain the ways by which strong interest supports intrinsic motivation when positive feedback is absent.

The inclusion of interest as a moderator of gender related feedback effects in various studies of the impact of feedback and praise might help researchers to detect differential gender-related effects also in various research designs and samples where such differential effects have not been found so far (Mueller & Dweck, 1998; Sansone, 1986; Henderlong & Lepper, 2000).

It is important to note that the construct of interest examined in this study lacked the value and knowledge components, which are parts of the construct of "well developed interest" as defined by Renninger and her colleagues (Renninger, 1992; Hidi et al., 2004). Interestingly, although the type of interest examined in our study could not be considered a well developed interest, it did buffer the negative effects of lack of positive feedback for boys and of positive feedback for girls. In future research, it would be interesting to examine the contribution of the value and knowledge components to the buffering effect of interest.

One limitation of research examining gender differences in reaction to feedback and praise is that the types of puzzles that are often used in those studies are usually more interesting and relevant to males than to females (Blank, Reis, & Jackson, 1984). However, the present study directly controlled for this source of systematic bias by directly assessing children's interest in the topic of logic puzzles.

The results of the present study cannot be generalized to populations that differ widely from the sample of middle class Israeli children examined in our research. To allow such generalizations, future research should investigate the joint effects of interest, type of feedback and gender across different ages, cultures and socio-economic statuses.

Past research has already shown that interest is an important cognitive and emotional resource (Hidi et al., 2004). The present research adds to the literature concerning the benefits of interest, one potential contribution of interest that has not received much attention until now: the role

of interest in sustaining children's intrinsic motivation under non-optimal feedback conditions.

Finally, the notion of interest as a resource that sustains intrinsic motivation in non-optimal learning contexts appears to have important educational implications. Given that most children are going to face non-optimal learning conditions at one point or another during their educational career, it appears important to help them develop strong interests that would allow them to tolerate feedback conditions that are unhelpful, perhaps even discouraging.

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References

- Ainley, M. (1998). Interest in learning and the disposition of curiosity in secondary students: investigating process and context. In I. Hoffman, A. Krapp, K.A. Renninger & L. Baumert (Eds.), *Interest and learning: proceeding of the secon conference on interest and gender*. Kiel, Germany: IPN; pp. 257–266.
- Ainley, M., Hillman, K., & Hidi, S. (2002). Gender and interest processes in response to literary texts: Situational and individual interest. *Learning & Instruction*, 12(4), 411–428.
- Alexander, P.A. (1997). Mapping the multidimensional nature of domain learning: The interplay of cognitive, motivational, and strategic forces. In M.L. Maehr & P.R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10). Greenwich, CT: JAI Press Inc, pp. 213–250.
- Alexander, P.A. & Murphy, P.K. (1998). Profiling the differences in students' knowledge, interest, and strategic processing. *Journal of Educational Psychology*, 90, 435–447.
- Assor, A. (2004). A model of a school that supports psychological needs and fosters emotional competence. In A. Aviram (Ed.), *Schools of the future*. Tel Aviv: Masada (Hebrew).
- Assor, A. & Kaplan, H. (2001). Mapping the domain of autonomy support: five important ways to enhance or undermine student's experience of autonomy in learning. In A. Efklides, J. Kuhl, & R.M. Sorrentino (Eds.), *Trends and prospects in motivation research*. Dordrecht, The Netherlands: Kluwer, pp. 101–120.
- Aviram, R. (1999). *Navigating through the storm: education in postmodern society*. Tel Aviv: Masada (Hebrew).
- Bandura, A. (1997). *Self-efficacy: the exercise of control*. New York: Freeman.
- Bandura, A. & Locke, E.K. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, 88(1), 87–99.
- Bandura, A. & Schunk, D. (1981). Cultivating competence, self efficacy, and intrinsic interest through proximal self motivation. *Journal of Personality and Social psychology*, 41, 586–598.
- Bereby-Meyer, Y., Assor, A., & Katz, I. (2004). Children's choice strategies: The effect of age and task demands. *Cognitive Development*, 19, 127–146.
- Blank, P.D., Reis, H.T., & Jackson, L. (1984). The effect of verbal reinforcement of intrinsic motivation for sex linked tasks. *Sex Roles*, 10, 369–386.

- Brophy, J. (1981). Teacher Praise: A functional analysis. *Review of Educational Research*, 51, 5–32.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.
- Deci, E.L. (1975). *Intrinsic Motivation*. New York: Plenum.
- Deci, E.L. (1992). The relation of interest to the motivation of behavior: a self determination theory perspective. In K.A. Renninger, S. Hidi & A. Krapp (Eds.), *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum, pp. 43–71.
- Deci, E.L. (1998). The relation of interest to motivation and human needs-The self-determination theory viewpoint. In L. Hoffman, A. Krapp, K.A. Renninger & L. Baumert (Eds.), *Interest and learning: proceeding of the seeon conference on interest and gender*. Kiel, Germany: IPN, pp. 146–163.
- Deci, E.L., Cascio, W.F., & Krusell, J. (1975). Cognitive evaluation theory and some comments on the Calder and Staw critique. *Journal of Personality & Social Psychology*, 31(1), 81–85.
- Deci, E.L., Koestner, R., & Ryan, R.M. (1999). A meta-analytic review of experiments examining the effect of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125, 627–668.
- Deci, E.L. & Ryan, R.M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Dweck, C.S., Davidson, W., Nelson, S., & Enna, B. (1978). Sex differences in learned helplessness: II. The contingencies of evaluative feedback in the classroom and III. An experimental analysis. *Developmental Psychology*, 14, 268–276.
- Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: the mode model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23). New York: Academic Press, pp. 75–109.
- Flink, C., Boggiano, A.K., Main, D.S., Barrett, M., & Katz, P. (1992). Children's achievement-related behaviors: the role of extrinsic and intrinsic motivational orientations. In A. K. Boggiano & T.S. Pittman (Eds.), *Achievement and motivation: A social-developmental perspective*. New York, NY, US: Cambridge University Press, pp. 189–214.
- Hannover, B. (1998). The development of self-concept and interests. In L. Hoffman, A. Krapp, K.A. Renninger & L. Baumert (Eds.), *Interest and learning: proceeding of the seeon conference on interest and gender*. Kiel, Germany: IPN, pp. 105–125.
- Harackiewicz, J.M. (1979). The effect of reward contingency and performance feedback on intrinsic motivation. *Journal of Personality and Social Psychology*, 37, 1352–1361.
- Harter, S. (1981a). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: motivation and informational components. *Developmental Psychology*, 17, 300–312.
- Harter, S. (1981b). A model of mastery motivation in children: individual differences and developmental change. In W.A. Collins (Ed.), *Minnesota symposia on child psychology: aspects of the development of competence*, Hillsdale, NJ: Erlbaum, 24, pp. 215–255.
- Henderlong, J. & Lepper, M.R. (2000). *The effect of Praise on children's motivation: person, product and process feedback*. Poster presented at the American Educational Research Association Annual meeting, April 2000, New Orleans Louisiana.
- Henderlong, J. & Lepper, M.R. (2002). The effect of praise on children's intrinsic motivation: A review and synthesis. *Psychological Bulletin*, 128(5), 774–795.
- Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research*, 60, 549–571.
- Hidi, S. & Berndroff, D. (1998). Situational interest and learning. In L. Hoffman, A. Krapp, K.A. Renninger & L. Baumert (Eds.), *Interest and learning: proceeding of the seeon conference on interest and gender*. Kiel, Germany: IPN, pp. 74–90.

- Hidi, S.E. & McLaren, J. A. (1990). Motivational factors and writing: the role of topic interestingness. *European Journal of Psychology of Education*, 6(2), 187–197.
- Hidi, S., Renninger, K.A., & Krapp, A. (2004). In D.Y. Dai & R.J. Sternberg (Eds.), *Motivation, emotion and cognition: integrative perspectives on intellectual functioning and development*. Mahwah, NJ: Lawrence Erlbaum, pp. 89–115.
- Hoffman, L. (2002). Promoting girl's learning and achievement in physics classes for beginners. *Learning and Instruction*, 12, 447–465.
- Kast, A. & Connor, K. (1988). Sex and age differences in responses to information and controlling feedback. *Personality and Social Psychology Bulletin*, 14, 514–523.
- Kelly, H., H. & Lamb, T.W. (1957). Certainty of judgment and resistance to social influence. *Journal of Abnormal and Social Psychology*, 55, 137–139.
- Koestner, R., Zukerman, M., & Koestner, J. (1989). Attributional focus of praise and children's intrinsic motivation: the moderating role of gender. *Personality and Social Psychology Bulletin*, 15, 61–72.
- Krapp, A. (2002). An educational–psychological theory of interest and its relation to self-determination theory. In E. Deci & R. Ryan (Eds.), *The handbook of self-determination research*. Rochester: University of Rochester press, pp. 405–427.
- Mueller, C.M. & Dweck, C.S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, 75, 33–52.
- Parsons, J.E., Kaczala, C.M. & Meece, J.L. (1982). Socialization of achievement attitude and belief: Classroom influences. *Child Development*, 53, 322–339.
- Pintrich, P.R. & Schunk, D.H. (2002). *Motivation in education*. N.J. Columbus, Ohio: Merrill Prentice Hall.
- Pittman, T.S., Davey, M.E., Alafat, K.A., Wetherill, K.V., & Kramer, N.A. (1980). Informational versus controlling verbal reward. *Personality and Social Psychology Bulletin*, 6, 228–233.
- Prenzel, M. (1992). The selective persistence of interest. In K.A. Renninger, S. Hidi. & A. Krapp (Eds.), *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum, pp. 71–98.
- Renninger, K.A. (1990). Children's play interests, representation and activity. In R. Fivush & K. Hudson (Eds.), *Knowing and remembering in young children* (Vol.3). Emory Cognition Series, NY: Cambridge Press, pp. 127–165.
- Renninger, K.A. (1992). Individual interest and development: implications for theory and practice. In K.A. Renninger, S. Hidi., & A. Krapp (Eds.), *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum, pp. 361–395.
- Renninger, K.A. (2000). Individual interest and its implication for understanding intrinsic motivation. In I. C. Sansone and J.M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. New York: Academic Press, pp. 375–407.
- Renninger, K.A., Ewan, L., & Lasher, A.K. (2002). Individual interest as context in exploratory text and mathematical word problems. *Learning and Instruction*, 12, 467–491.
- Renninger, K.A. & Hidi, S. (2002). Student interest and achievement: developmental issues raised by a case study. In A. Wigfield & J.S. Eccles (Eds.), *Development of achievement Motivation*. New York: Academic Press, pp. 173–195.
- Ryan, R.M. & Deci, E.L. (2000). Self determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.
- Sansone, C. (1986). A question of competence: the effect of competence and task feedback on intrinsic interest. *Journal of Personality and Social Psychology*, 51(5), 918–931.
- Sansone, I.G., Weir, C., Harpster, L., & Morgan, C. (1992). Once a boring task always a boring task? Interest as a self-regulatory mechanism. *Journal of Personality and Social Psychology*, 63, 379–390.

- Schiefele, U. (1996). Topic interest, text representation, and quality of experience. *Contemporary Educational Psychology*, 21(1), 3–18.
- Schiefele, U. (1999). Interest and learning from text. *Scientific Studies of Reading*, 3, 257–280.
- Schiefele, U. (2001). The role of interest in motivation and learning. In J.M. Collis & S. Messick (Eds.), *Intelligence and Personality: Bridging the Gap in Theory and Measurement*. Mahwah, NJ: Lawrence Erlbaum Associates, pp. 163–194.
- Silvia, P.J. (2001). Interest and Interests: The psychology of constructive capriciousness. *Review of General Psychology*, 5(3), 270–290.
- Turner, J.C. (1993). *Social influence*. Buckingham, UK: Open University Press.
- Vansteenkiste, M. & Deci, E.L. (2003). Competitively contingent rewards and intrinsic motivation: can losers remain motivated? *Motivation & Emotion*, 27(4), 273–299.
- White, R.W. (1959). Motivation reconsidered: the concept of competence. *Psychological Review*, 66, 297–333.
- Wigfield, A. & Eccles, J.S. (1992). The developmental of achievement task values: a theoretical analysis. *Developmental Review*, 12, 265–310.
- Zimmerman, B.J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25, 82–91.
- Zinsler, O., Young, J.G., & King, P.E. (1982). The influence of verbal reward on intrinsic motivation in children. *Journal of General Psychology*, 106, 85–91.

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