

University of Tartu
Institute of Psychology

Dmitri Rozgonjuk

**THE IMPACT OF LOCAL COMPARISON FEEDBACK ON TEST PERFORMANCE
RELATED EVALUATIONS**

Master's thesis

Supervisors: Olev Must, PhD

Karin Täht, PhD

Running head: The impact of local comparisons

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Lokaalse võrdluse mõju testisooritusega seotud hinnangutele

LÜHIKOKKUVÕTE

Varasemates töödes on näidatud, et lokaalne võrdlus ehk võrdlus väheste indiviididega võib mõjutada enesehindamist tugevamalt kui üldine ehk objektiivne võrdlus (nt pingerea tulemused jm) (Zell & Alicke, 2009, 2010). Käesolevas töös uurisin, kas lokaalse võrdluse domineerimine ilmneb soorituse headuse ning sooritusega rahulolu hinnangutes ning Weineri atribuutsiooniteooria (1985, 2010) kesksete kategooriate hinnangutes: võimekuses, testi keerukuses, pingutuses, juhuses. Uuringus osales kokku 126 üliõpilast, kelle seast 114 inimese andmeid kasutati edaspidistes analüüsid. Uuritavad täitsid vaimse võimekuse testi ning said võltstagasisidet oma sooritusele. Soorituse järel hinnati soorituse headust, sooritusega rahulolu, vaimset võimekust, testi keerukust, enda pingutust ning juhuse rolli sooritusel. Lokaalse võrdluse mõju uurimiseks sooritusejärgsetele hinnangutele viidi läbi 2 x 2 astakutepõhise kovariaadiga dispersioonanalüüsi, võttes kontrollmuutujana arvesse testiskoori. Tulemustest ilmnes, et lokaalse tagasiside lisamine avaldas mõju soorituse headuse ning sooritusega rahulolu hinnangutes. Aruteluosas diskuteerisin tulemuste tähenduse, nende teoreetilise ja praktilise väärtuse, uuringu kitsaskohtade ning edasiste uurimisideede üle.

Märksõnad: sotsiaalne võrdlus, lokaalse domineerimise efekt, kausaalne atribuutsioon

The impact of local comparison feedback on test performance related evaluations**ABSTRACT**

It has previously been shown that local comparison – the comparison within a small group of individuals – affects people’s self-evaluations more than general – or objective comparison (overall ranking, etc) (Zell & Alicke, 2009, 2010). In this paper, I was investigating whether the dominance of local comparisons emerges in people’s self-evaluations regarding performance, satisfaction with the performance, and in Weiner’s attribution theory’s (1985, 2010) central categories: ability, test-difficulty, effort, and luck. In total, 126 students participated in the study; however, 114 persons’ data was used in subsequent analyses. Participants took a mental abilities test and received bogus feedback regarding their performance. After receiving the feedback, participants evaluated their performance, their satisfaction with the performance, their mental abilities, test-difficulty, their effort and the role of luck in their performance. A 2 x 2 rank-based analysis of covariances controlled for test score was conducted to analyze the effect of local comparison on the participants’ evaluations. Results showed that local comparisons affected the evaluations of performance and the satisfaction with the performance. In the discussion section the meaning of the results, their theoretical and practical implications, the limitations of the study, and ideas for further research were discussed.

Keywords: social comparison, local dominance effect, causal attribution

INTRODUCTION

Providing and receiving feedback is an essential aspect in many domains of life; it is an integral facet of education for it improves learning efficiency (Hattie & Timperley, 2007; Shute, 2008). However, there are findings which illustrate that people are influenced by social comparison feedback, which may lead to distorted sense of self-evaluations (Marsh & Parker, 1984; Zell & Alicke, 2009, 2010).

The aim of this thesis was to investigate how social feedback impacts test performance related self-evaluations and attributions. Specifically, the role of local comparisons in feedback regarding a mental abilities test performance was explored; it was of interest to find out how does the type of feedback affect people's evaluation to their performance, their satisfaction with the performance, and their evaluations regarding the main categories of Weiner's attribution theory (1985, 2010): ability, test-difficulty, effort, and luck.

Social comparisons

On a daily basis, humans are all affected by social comparisons. One's self-perception is largely influenced by aforementioned phenomena. Leon Festinger has proposed the social comparison theory (1954) which, in essence, states that humans have a natural drive to acquire as exact evaluations about oneself as possible. When objective information is absent, people tend to compare their opinions and abilities with those who are usually superior. The latter is explained by gaining knowledge about potential self-improvement.

Throughout the times, this theory has been tested and developed further mainly in light of explaining the motivation behind social comparisons. In addition to the idea that people compare themselves with others for the sake of objective self-evaluation, social comparisons also serve the motivational goals of possible self-improvement and self-enhancement (Wayment & Taylor, 1995). The comparison might emerge from the need of improving oneself – this happens in the case of upward comparisons where people compare themselves with more competent others. However, in case of frustration or unfavourable situations, a person might instead compare oneself with inferior others for protecting one's self-esteem - this kind of ego-defence mechanism has been deemed downward comparison (Banaji & Prentice, 1994; Major, Testa & Blysm, 1991; Taylor & Lobel, 1989).

Aspinwall (1997) has found that stressful, uncertain and novel situations might facilitate the emergence of comparisons. Ruble and Frey (1991) have discovered that competitive contexts might amplify social comparisons, for relative rankings are perceived as explicit comparison sources; those authors also suggested that performance-related situations

might diminish the importance of social comparisons because one seeks to outperform oneself rather than others.

Social comparisons might not form consciously (Wood, 1989), for the effect of comparisons on self-esteem and self-concept might come from sources chosen unintentionally (Guiot, 1978). Also, a person may compare oneself with not only with another individual but with a group as well (Masters & Keil, 1987; Wood, 1989). The social information used in the comparison could also originate from (certain) stereotypes or fictional characters (Wood, 1996).

Social comparisons are noteworthy despite being common and often daily experiences for they are believed to effect various domains of life. It has been shown that these comparisons could shape a person's future perspectives and aspirations (Davis, 1966), they might affect one's mental health (Heidrich & Ryff, 1993), experiencing work-related stress and burnout (Dijkstra, Gibbons, & Buunk, 2010; Halbesleben, & Buckley, 2006; Michinov, 2005) and perception towards health risks (Zell & Alicke, 2013). Comparisons could also affect the process of forming one's academic self-concept (Marsh, 1987; Marsh & Parker, 1984).

The impact of social context in the example of the big-fish-little-pond effect (BFLPE)

Festinger in his original theory (1954) did not emphasize the role of environmental aspects in social comparisons; however, decades of research have demonstrated that those surrounding us might have a solid effect on our self-concept and self-evaluations (Marsh & Parker, 1984; Zell & Alicke, 2009).

More than half a century ago, Davis's work (1966), in which he investigated students of high- and low-achieving universities, was published. The findings were paradoxical: high-ability students of low-achieving schools reported better future perspectives and higher aspirations compared to below-average students in academically better-achieving higher educational institutions. Davis (1966) noted that „it is better to be a big frog in a small pond than a small frog in a big pond“ (p. 31). In other words, it was described that it is better to be a more able person among low-ability peers than with lower abilities in a highly-achieving social environment. The phenomena was named through the used metaphor – the *frog-pond-effect*. However, Davis (1966) did not take investigate the impact of students' abilities and self-concept in the frog-pond effect.

A few decades after Davis's publication, Marsh & Parker (1984) replicated the controversial findings. These authors showed that the *big-fish-little-pond effect* (BFLPE) –

virtually the same phenomena described by Davis (1966) – seems to be significant in the formation of students' academic self-concept. Specifically, the selectivity of an educational institution is negatively correlated to the students' academic self-concept (Marsh, 1987; Marsh, 1991; Marsh & Parker, 1984). *Self-concept* is a term that describes one's perception of oneself, and is shaped by one's interaction with the environment and other people (Shavelson, Hubner, & Stanton, 1976); *academic self-concept* is, similarly, a cognitive and affective self-evaluation that might influence one's academic achievements (DeFreitas & Rinn, 2013) – it has been observed that academic self-concept is also related to grade point average (Gerardi, 2005; Lent, Brown & Gore, 1997).

Throughout the last decades, the BFLPE has been researched in different environmental contexts and it might be considered to be an intercultural phenomenon, because BFLPE has been found in several countries and in various cultures (Marsh *et al*, 2014; Seaton, Marsh & Craven, 2009).

It has been shown that positive self-concept is related to better outcomes in mental health and academic achievements (Chapman, Tunmer, & Prochnow, 2000; Guay, Marsh, & Boivin, 2003). Academic self-concept can also influence students' curricular preferences, long-term educational ambitions, educational persistence and other academic outcomes (Guay, Larose, & Boivin, 2004; Guay, Marsh, & Boivin, 2003; Marsh & Craven, 2006; Marsh & Hau, 2003). Additionally, Marsh (1991) reported that the better (or more positive) the student's academic self-concept, the more probable it is for that student to pursue his or her studies in post-secondary education; the „big fish“, however, who left their „small pond“ and continued their studies in a „big pond“, had a decline in their academic self-concept (Marsh, Chessor, Craven, & Roche, 1995; Marsh, Kong, & Hau, 2000).

As the aforementioned research illustrates, the effect of social environment and the influence of peers that one is exposed to might be of substantial nature.

The dominance of local comparisons in social environments

One might enquire, what could be the rationale behind BFLPE. It has been argued that BFLPE is occurring due to the the impact of social comparisons and its effect on individuals' self-evaluations (Marsh *et al*, 2014; Zell & Alicke, 2009, 2010). As academic settings and the logic of evaluation processes in the classroom (see Angelo & Cross, 1993) favor the emergence of social comparisons students actively engage in comparing one another's academic results (Dijkstra, Kuyper, Van der Werf, Buunk, & Van der Yee, 2008; Levine, 1983). In the light of the research, then, it seems plausible that high-achievers in low-

achieving schools tend to compare themselves with less able peers, below-average students in a highly selective educational institution tend to engage in upward comparisons (Marsh, Trautwein, Lüdtke, & Köller, 2008). Congruent with previous research (Banaji & Prentice, 1994; Major, Testa & Blysm, 1991; Taylor & Lobel, 1989), it might be assumed that the rationale of comparisons for „big fish in small ponds“ serve the ego-defensive motives, whereas „small fish in big ponds“ might compare their abilities and performance for the sake of self-improvement.

Zell & Alicke (2009) have investigated the paradoxical findings of BFLPE experimentally in laboratory settings. Participants in their set of studies were administered a vocabulary test after which they received bogus feedback about their performance: the feedback contained information about the participants' ranking among their school, and their university's ranking among other institutions of higher education.

The researchers hypothesized that there are, broadly speaking, two levels of social comparison feedback in terms of generalization: local (e.g. a person's ranking among schoolmates) and general (e.g. school's ranking among other schools) social comparison. Roughly put, local comparisons are comparisons with a few, discrete individuals, and general comparisons are the comparisons made with larger aggregates. General comparisons, in terms of accurate self-evaluations, should be the more objective conditions.

After learning of their results, participants were asked to evaluate their test-performance and their overall vocabulary abilities. The data of these variables was then aggregated to form one self-evaluation index.

The findings of the data analyses indicated that local comparison information superseded general comparisons; in other words, when people were provided with both general and local information, their self-evaluation followed the logic of BFLPE in which high-performers in a low-performing group had higher self-evaluations than below-average performers in a high-performing group. This laboratory finding was termed as the local dominance effect (Zell & Alicke, 2009, 2010).

Research on local dominance in self-evaluations was inspired by studies of BFLPE; due to the scarcity of literature about local comparisons and their effects on individuals, I conducted a replication study similar in design with the original publication by Zell & Alicke (2009; Study 1) (for my replication study, see Rozgonjuk, 2013). I managed to replicate the findings that were in accordance with the results of the original study – people tend to neglect general information, and local comparisons seem to supersede more objective information. These

works have led to an assumption that the effect of local comparisons might explain the underlying mechanism of BFLPE. In fact, Marsh *et al* (2014) have also considered that this may be the case.

However, there are two limitations with which none of the previous works have dealt with. Firstly, both Zell & Alicke (2009) and myself (Rozgonjuk, 2013) have not used ability-measuring tests in experimental approaches; both approaches have addressed the questions of the impact of local comparisons by using a bogus test in which all given answers were correct; this has been explained by higher perceived credibility of provided feedback due to the test being ambiguous in nature. It would be interesting to learn whether it would be possible to use a mental abilities test that also provides some information about people's performance. Real performance, in turn, could be controlled in statistical analyses.

The second issue which causes slight confusion in interpreting the results of those studies (Rozgonjuk, 2013; Zell & Alicke, 2009), is the fact that two self-evaluation variables that differ in nature (namely, evaluations to performance and to ability) were aggregated as a single self-evaluation index. This has brought up the question: What *exactly* do local comparisons influence? Even though both of those variables seem similar, evaluating performance *is not* the same as evaluating one's ability, because performance might be *caused* by ability. To answer the abovementioned question, it is also reasonable to divert one's attention to the test-takers' attributions.

Achievement motivation and causal attribution

People are naturally interested in explaining their own and others' behaviour; therefore, they are interested in explaining their fortunes and misfortunes in terms of causality. Weiner has developed an attribution theory (1979, 1985, 2010) which primarily focuses on achievement. According to the theory, people's reactions to success or failure are strongly influenced by their attributions; humans tend to ask themselves why they succeeded or failed, and their attributions have an impact on their cognitive and affective reactions, task performance persistency, selection of assignments, and self-concept (Mikulincer, 1989; Stroud & Reynolds, 2009).

Attributions are classified into three causal dimensions: (a) the locus of control (internal vs external), (b) stability (stable vs unstable), and (c) controllability (controllable vs uncontrollable).

The *locus of control* dimension means that achievements are attributed to aspects that are either internal (caused directly by the person and their characteristics) or external

(situational, derived from a source outside a subject) (Weiner, 1985, 2010). According to Mikulincer (1986), internal attribution has greater influence on one's self-evaluations than external attribution; people also tend to experience more negative affects when the attribution is internal. It has also been found that if self-efficacy (an individual's belief in his or her ability to have the right behaviours needed to produce favorable outcomes; Bandura, 1977) is related to external attributions, academic achievements tend to be lower. However, if self-efficacy is based on internal attributions, academic outcomes tend to be higher (Salanova, Martinez, & Llorens, 2012). External attributions are also related to emotional distress and low self-esteem (Matthews, Deary, & Whiteman, 2009).

The *stability* dimension is mainly associated with goal-attainment (Weiner, 1985) – people who tend to attribute their misfortunes to stable factors, experience more hopelessness regarding upcoming tasks. Those who attribute their failure to unstable causes, tend to be more optimistic and hopeful towards future goals (Weiner, Nierenberg & Goldstein, 1976; Weiner, 1985, 2010). Additionally, if failure is attributed to unstable causes, more time is spent on improving one's performance (Weiner, 1995); otherwise, the aspiration of succeeding decreases, followed by a decline in effort (Försterling, 2001).

The *controllability* dimension refers to the achievement either being under or out of the person's control. Sorić ja Palekčić (2009) have found that controllability might be a mediating variable between students' academic achievements and their interests. According to that paper, lacking in terms of academic success might affect the perception of controllability, which, in turn, affects the motivation for learning. A poor academic performance might result in reduced perception of controllability; and the less one feels that one can control the performance, the smaller the interest to learn. Controllability also seems to impact learning-related affect: for instance, Forsyth and MacMillan (1981) have found that students who reported having greater perceived control over their performance, reported higher levels of positive affect.

Thus far, the three different dimensions of causal attribution have been described. However, Weiner (1985, 2010) has pointed out that there are four important factors that fall into aforementioned dimensions. Those factors are: *ability* (internal, stable, uncontrollable), *effort* (internal, unstable, controllable), *task difficulty* (external, stable, uncontrollable), and *luck* (external, unstable, uncontrollable) (Försterling, 2001).

Some of the main hypotheses of the theory state that high self-esteem and very good academic outcomes are mainly attributed to internal, stable and uncontrollable causes, such as

overall mental ability. On the other hand, failure and poor outcomes are explained through either low effort, or are attributed to external variables, such as task difficulty or luck (Graham & Williams, 2009; Weiner, 1985, 1996).

However, it has not been studied if local comparison information affects people's achievement attributions. Previous works (Rozgonjuk, 2013; Zell & Alicke, 2009) have examined the impact of the type of feedback on two variables (self-evaluation of performance and ability) which were aggregated into a single self-evaluation index – ignoring the fact that ability could be perceived as a causal factor. Weiner's attribution theory (1985, 2010) could be helpful in specifying the influence of local comparisons on test performance related evaluations, allowing to analyze both the evaluations of performance and mental ability in separate, and adding three other important variables (test difficulty, effort, and luck) in explaining the perception of the outcomes of the participants.

The current study

In this thesis, I am going to further investigate the knowledge concerning local dominance in test performance related evaluations.

The effects of local comparison feedback have not been studied with a real ability-measuring test in laboratory conditions – this has previously (Zell & Alicke, 2013) been explained to be important in increasing the credibility of bogus feedback, as it happens in cases of tests ambiguous in nature (Guenther & Alicke, 2008). However, a real ability-measuring test might be an ecologically more valid approach concerning studying test performance related evaluations. In this paper, a shortened mental abilities test is used, and the score of participants will be controlled for in statistical models.

Also, the ambition of this paper is to specify the test performance related evaluations that are affected by local comparison feedback. In previous works (Rozgonjuk, 2013; Zell & Alicke, 2009) two factors – evaluation of performance and abilities – were measured using separate items, but aggregated into a single index of self-evaluation in further analyses. This created some unclarity in the specific impact of local comparisons. In addition, as the link between local comparison feedback and performance-related attributions have not been studied, some additional measures are added, compared to previous works on local dominance in self-evaluations. It is also of interest to take into account the participants' satisfaction with the performance – this might, in a way, reflect Weiner's (1985, 2010) success-failure scale. It has previously been shown that those who receive feedback claiming they outperformed the

majority, reported more satisfaction compared to those who were told that they ranked below average (Möller & Köller, 2001).

In conclusion, six dependent variables are in the focus of this study. The test performance related evaluations that will be measured using an experimental approach are: evaluation of performance, satisfaction with the performance, evaluation of one's mental abilities, test difficulty, effort, and the role of luck regarding the performance. These variables will then be controlled for participants' test score. The three research questions posed are:

1. Does local comparison feedback affect the evaluations of performance or the ability?
2. Do local comparisons affect the satisfaction with the performance?
3. Does local comparison feedback affect people's test performance related attributions; specifically, will there be intergroup differences in evaluations of mental ability, test difficulty, effort, and luck?

Based on the literature, it is reasonable to assume that local comparisons in self-evaluations might affect all the dependent variables mentioned in this section. Specifically, the impact of local comparison feedback is described in this work in terms of intergroup differences in evaluations. Concerning this, I have hypothesized that:

Local comparison feedback will have an impact on

H1: *the evaluation of the performance;*

H2: *the evaluation of mental abilities;*

H3: *effort evaluations;*

H4: *test-difficulty evaluations;*

H5: *luck evaluations;*

H6: *the satisfaction with the performance.*

METHOD

Sample

In total, 126 students (66 female, 60 male) from various post-secondary educational institutions participated in the study, $M_{age} = 21.6 \pm 2.5$ years. Participation in the study was voluntary, participants also signed an informed consent form. It was possible to receive course credit for participation.

Materials

The current study used two short questionnaires and a shortened version of a mental abilities test. All of these materials were located in an internet-based research platform *Kaemus* (<https://kaemus.psych.ut.ee/>) which is administered by the Institute of Psychology of University of Tartu, Estonia. Every participant had to register on the website in order to take part in the study.

Demographics questionnaire. Before taking the mental abilities test, all participants had to fill in a short questionnaire. There were items regarding basic demographics (e.g. gender, the year of birth), education (e.g. major, etc) and previous experience with mental abilities tests.

The Shortened Version of Academic Test (SVAT15). SVAT15 is a shortened mental abilities test generated in the Department of Psychology of University of Tartu by Gerli Silm (with the assistance of Olev Must, PhD, and Karin Täht, PhD) solely for the purpose of this study. It is based on the Academic Test, or the scholastic aptitude test, of University of Tartu. The original, full-version of the test is used for matriculation examination of potential student candidates. It consists of seven subcategories (e.g. vocabulary, math, visuo-spatial thinking, etc) with 180 items in total, with the time limit for taking the test being 180 minutes (Must, 2013; Must & Allik, 2002).

Before the SVAT15 was created for this study, three other versions of Shortened Academic Tests were used for the purpose of research. Those tests were assembled using various items from full versions of Academic Tests administered in 2008-2012 with the mean item difficulty of $\pi = 0.5$. All of the previous Shortened Academic Tests included 45 items in total: 15 vocabulary tasks, 15 math tasks, and 15 visuo-spatial tasks (Silm, Must & Täht, 2013). Other subtests have not been included in shortened versions.

Similarly, the test created for this study also consists of three subcategories (vocabulary, math, and visuo-spatial assignments); however, each subtest had seven items (21 items altogether). For SVAT15, five of the most difficult ($\pi = 0.32-0.62$) and two of the most simple ($\pi = 0.60-0.79$) items for each subtest were selected from the items of tests administered in 2008-2012. The time limit for the SVAT15 was 16 minutes.

Previous versions, both the full and the shortened ones, have allowed the use of pencil and paper for calculations and notes; however in SVAT15 it was not permitted to use any other resources for note-taking and all the calculation processes had to be carried out without writing them down.

There were many significant differences between the SVAT15 and previous Academic Test versions. SVAT15 is substantially shorter, the use of other resources for writing notes and calculations was prohibited, and there was a shorter time limit. These conditions should be sufficient to diminish the difference between people who have taken some version of the Academic Test and those who have not had previous experience with it.

The feedback to the performance regarding the SVAT15 was, without the knowledge of the participants, previously installed. The actual test scores were not shown, and every participant received just social feedback (results compared to others) described in the section *Experimental design*. The absence of the test score was necessary to diminish the effect of the score to test performance related evaluations.

The final questionnaire. To ensure that participants had seen and understood the feedback, this questionnaire started with manipulation check; participants were asked to recollect their results. If a person did not report the correct percentiles, his or her data was excluded from further analyses.

The aim of the questionnaire was to evaluate test performance related variables (see *Experimental design*). Also, participants were asked what the aim of the study was (open-ended question with a text box) and whether they had anything else that they would like to add (open-ended question with a text box). The purpose of these items was to find out and exclude from the data analyses those participants who were aware of the real aim of the study.

Experimental design

To answer the research questions of this paper, a 2 (general comparison feedback: *better than 40% vs better than 80% of all the test takers*) x 2 (local comparison feedback: *available vs unavailable*) between-subjects design was used. All of the participants were randomly assigned to experimental conditions and every person could only participate in the study once.

Independent variables. The independent variable of this study is social comparison feedback that every participant received after taking the SVAT15. There were four experimental conditions based on the feedback:

1. Below-average general feedback (local comparison unavailable):

“The results of the students who took the test during this session (incl. You) are better than at least 40% of all previous test-takers.”

2. Above-average general feedback (local comparison unavailable):

“The results of the students who took the test during this session (incl. You) are better than at least 80% of all previous test-takers.”

3. Below-average general & above-average local feedback (local comparison available):

“The results of the students who took the test during this session (incl. You) are better than at least 40% of all previous test-takers.

Your results are better than at least 80% of all other students that took the test in this session.”

4. Above-average general & below-average local feedback (local comparison available):

“The results of the students who took the test during this session (incl. You) are better than at least 80% of all previous test-takers.

Your results are better than at least 40% of all other students that took the test in this session.”

The aforementioned percentiles are based on previous works (Rozgonjuk, 2013; Zell & Alicke, 2009).

Dependent variables. There were six dependent variables in this work. They were measured on a 10-point *Likert*-like ordinal scale. The variables were, in essence, test performance related evaluations regarding (in that order): mental abilities, performance, satisfaction with the performance, test difficulty, effort, and luck. They were measured as follows:

1. *„How would You evaluate Your mental abilities?“*
(1 – very poor ... 10 – very good)
2. *„How would You evaluate Your test performance?“*
(1 – very poor ... 10 – very good)
3. *„How satisfied are You with the performance?“*
(1 – not satisfied at all ... 10 – very satisfied)
4. *„How difficult was the test?“*
(1 – very simple ... 10 – very difficult)
5. *„How much was there effort to achieve the best result?“*
(1 – minimal ... 10 – maximal)
6. *„How much did luck affect Your performance?“*
(1 – not at all ... 10 – greatly)

Control variable (covariate). The test score of the participants was controlled for in all statistical models.

Procedure

In order to conduct the experiments, I followed the design of previous similar works (Rozgonjuk, 2013; Zell & Alicke, 2009; 2013).

The participants were asked to take part in a study that was aimed to develop a Shortened Version of Academic Test which was used to study test performance related factors.

The experiments took place in a computer laboratory (Lossi 36-116, Tartu). The computers in the room were situated in six rows, every row had four columns. During the experiments, only eight computers were used, the four-computer-columns were at opposite sides of the room. The reason behind this is that the possibility of seeing the other participants' answers would be minimal.

Every session included 6-8 students who could freely pick one of the eight computers upon entering the room.

All of the participants were asked to sign two copies of informed consent with the conditions of participation. Next to the computers were the necessary codes that had to be inserted in order to participate in the study. The codes also determined experimental conditions.

Prior to filling out the first questionnaire, conditions and instructions of the session were introduced to the participants. They were then asked to fill out the first questionnaire.

After filling out the first questionnaire, all of the participants started solving the SVAT15 simultaneously. The participants were told that the test could be finished only when the time (16 minutes) was up; it was explained to them that otherwise correct results would not be calculated.

When the time was up, participants received manipulated feedback to their performance. The feedback contained only social feedback based (comparisons with others) on experimental conditions.

After seeing their results, participants then filled out the final questionnaire in which they had to evaluate test performance related factors.

In the end, the participants were debriefed about the real aim of the study. The participants were asked not to spread information regarding the real aim of the study until all of the experiments were conducted.

This procedure was perfected beforehand using a pilot study with 14 students.

Ethical aspects

The main ethical concern with studies of this kind is the potential influence of bogus feedback that might result in flawed self-evaluations of the participants. To decrease the risk, all participants were debriefed right after the experimental part had come to an end. Also, after all the sessions had been conducted, participants had the opportunity to see their actual test scores in *Kaemus*.

This study was approved by the Research Ethics Committee of the University of Tartu (protocol N^o: 241/T-4)

Data analysis

To analyze the data, IBM SPSS Statistics, Version 20.0 (IBM Corp, 2011) was used.

Due to the fact that dependent variables in this work were measured on an ordinal scale, the use of parametric tests was not justified. The problem with ordinal data is that even though it describes the order of values, it can not be assumed that different intervals are equally comparable. For instance, it can not be assumed that on a 10-point scale (1 = *very poor* ... 10 = *excellent*), the difference between scores 2 and 3 is the same as between 7 and 8. Because of that, arithmetic means and standard deviations of the scores cannot be calculated; however, median and range could be used as the statistical estimates of average values.

In this work, the effect of local comparison feedback on dependent variables is studied through the 2 x 2 experimental design. As ability *per se* might be an important factor influencing, for instance, the credibility of the feedback, it is reasonable to use the test score as a covariate in statistical analyses.

Instead of using raw data on an ordinal scale, many researchers have suggested alternative methods to deal with the kind of data and design presented in this study. It is mostly advised to use two-way rank-based/rank transformation analyses of covariance on the ranks of the dependent variables (Conovan & Iman, 1982; Olejnik & Algina, 1984; Quade, 1967). One of the highly appreciated analogues for a parametric counterpart is an approach proposed by Quade (1967): for conducting the analysis, firstly, both the dependent variable and covariate undergo a monotonous rank transformation; then, the unstandardized residuals of linear regression between the ranks of the dependent variable and covariate are calculated to account for the control variable (Conovan & Iman, 1982). Afterwards, the usual procedure of two-way analysis of variance on those residuals will follow. It has been shown that this method is also reliable with multifactor experimental designs (Conovan & Iman, 1982; Quade, 1967).

In this work, the nonparametric approach proposed by Quade (1967) and others (Conovan & Iman, 1982; Olejnik & Algina, 1984) was used.

Spearman's rank correlation analysis was used in order to calculate the correlations between dependent variables.

Mann-Whitney U test was used to calculate follow up contrasts.

Figures were generated in Microsoft Excel 2010 (Microsoft, 2010).

RESULTS

Out of 126 students participated in the study, the data of 12 people was excluded from further analyses, for some of the participants did not report the manipulation check (six people) or were aware of the real aim of the study (six people). Therefore, the data of 114 people (63 female, 51 male; $M_{age} = 21.4 \pm 2.2$) was used in subsequent analyses (see Table 1).

Table 1

Allocation of the participants to the experimental conditions

	Male	Female	Total
Gen40	12	16	28
Gen40Lok80	14	16	30
Gen80	11	15	26
Gen80Lok40	14	16	30
Total	51	63	114

Note. Gen40 = below-average general feedback; Gen40Lok80 = below-average general and above-average local feedback; Gen80 = above-average general feedback; Gen80Lok40 = above-average general and below-average local feedback.

Neither gender, educational variables nor previous experience with Academic Test had a statistically significant impact on the dependent variables (all $ps > .05$). Also, there were no intergroup differences in the actual test score, $F(3, 110) = .12, p = .95$.

Table 2 illustrates the correlations between all dependent variables. As shown, there is a very high correlation between two variables – performance evaluation and satisfaction with the performance ($r = .84, p < .01$). Also, some other statistically significant correlations can be observed.

Table 2

The Spearman correlation coefficients between all dependent variables (N = 114)

	1	2	3	4	5
1. Mental abilities evaluation					
2. Performance evaluation	.30**				
3. Satisfaction with the performance	.19*	.84**			
4. Test difficulty evaluation	-.03	-.13	-.16		
5. Effort evaluation	.00	.26**	.25**	.12	
6. Luck evaluation	-.11	-.33**	-.41**	.03	-.29**

Notes. * = $p < .05$, ** = $p < .01$. Correlations are controlled for test score ($M = 11.57$).

The impact of local comparison feedback on test performance related evaluations

To investigate the effect of provided social feedback on the dependent variables (evaluations of mental abilities, performance, satisfaction with the performance, test difficulty, effort, and luck), a 2 (general comparison feedback: *better than 40% vs better than 80% of all the test takers*) x 2 (local comparison feedback: *available vs unavailable*) rank-based analysis of covariance was performed with every dependent variable. The results of each statistical model are presented in a compact fashion in Table 3.

Table 3

The impact of provided social comparison feedback on test performance related evaluations

Dependent variable	df	F	p	η_p^2
Mental abilities	3	1.39	.25	.04
Performance evaluation	3	3.54	.02*	.09
Satisfaction with the performance	3	4.04	.01*	.10
Test difficulty	3	.31	.82	.01
Effort	3	1.03	.38	.03
Luck	3	2.24	.09	.06

Notes. * = $p < .05$. Results of a 2x2 rank-based analysis of covariance. Statistics of the corrected models of the analyses are presented. All of the models are controlled for test score ($M = 11.57$).

According to Table 3, there were only two evaluations that were affected by the provided feedback on a statistically significant level (performance evaluation and satisfaction with the performance). Table 4 examines these models in depth.

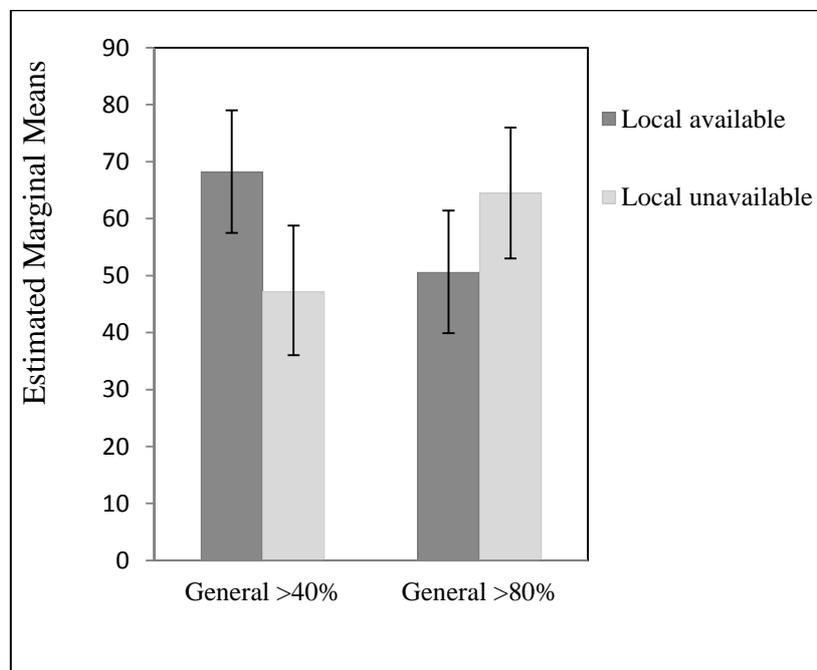
Table 4

The impact of provided social comparison feedback on satisfaction evaluation and on satisfaction with the performance

	<i>df</i>	<i>F</i>	<i>p</i>	η_p^2
Performance evaluation				
<i>Corrected model</i>	3	3.54	.02*	.09
<i>Local comparisons</i>	1	.00	.97	.00
<i>General comparisons</i>	1	.41	.52	.00
<i>Local x General</i>	1	9.95	.00**	.08
Satisfaction with the performance				
<i>Corrected model</i>	3	4.04	.01*	.10
<i>Local comparisons</i>	1	.03	.87	.00
<i>General comparisons</i>	1	1.05	.30	.00
<i>Local x General</i>	1	10.67	.00**	.09

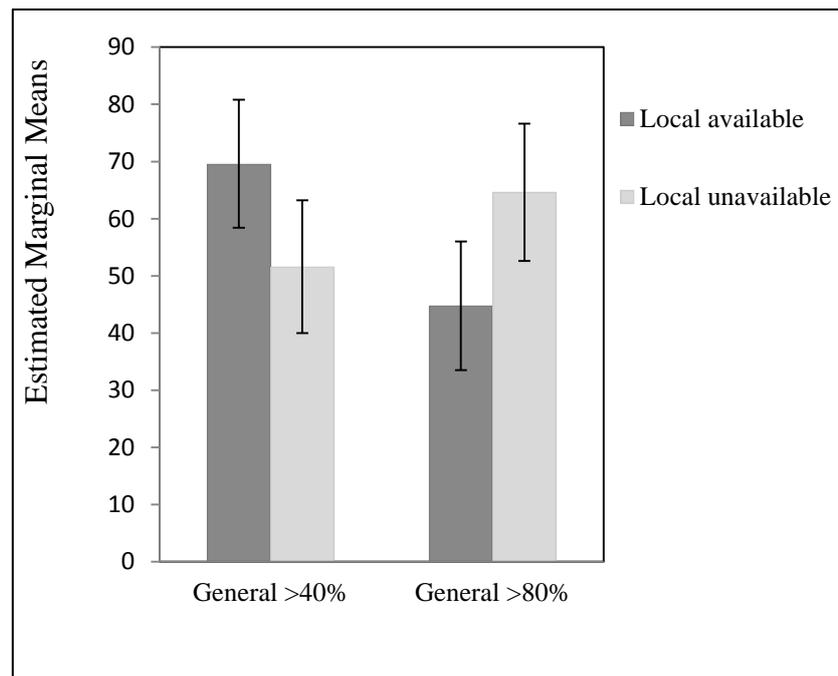
Notes. ** = $p < .001$. Results are controlled for test score ($M = 11.57$).

As can be seen in Table 4, there is a significant interaction between different types of feedback in both statistical models. Intergroup differences are illustrated in Figure 1 and Figure 2.



Note. CIs = 95%.

Figure 1. The interaction between local and general comparison feedback in performance evaluations.



Note. CIs = 95%.

Figure 2. The interaction between local and general comparison feedback in satisfaction with the performance.

Follow up contrasts showed that there were statistically significant group differences in the performance evaluations. Adding above-average local comparison feedback ($M_{\text{rank}} = 68.70$) to below-average general feedback ($M_{\text{rank}} = 49.75$) resulted in higher performance evaluations, $U = 288.00$, $p = .02$. However, adding below-average local comparison feedback ($M_{\text{rank}} = 47.91$) to above-average general feedback ($M_{\text{rank}} = 63.98$) was accompanied with the deflation in performance evaluations, $U = 275.50$, $p = .04$. Those who received below-average general and above-average local comparison feedback ($M_{\text{rank}} = 68.70$), evaluated their performance higher than those who received above-average general and below-average local comparison feedback ($M_{\text{rank}} = 47.91$), $U = 287.00$, $p = .02$.

Similar patterns were found in the satisfaction with the performance evaluations. The addition of above-average local comparison feedback ($M_{\text{rank}} = 69.85$) inflated the satisfaction with the performance in below-average general comparison condition ($M_{\text{rank}} = 51.17$), $U = 268.50$, $p = .02$. In above-average general conditions ($M_{\text{rank}} = 64.31$), adding below-average local comparison feedback ($M_{\text{rank}} = 45.15$) lowered the satisfaction with the results, $U = 263.00$, $p = .03$. Providing below-average general and above-average local comparison feedback ($M_{\text{rank}} = 69.85$) was accompanied with higher evaluations that in the case of above-average general and below-average local comparison feedback condition ($M_{\text{rank}} = 45.15$), $U = 259.00$, $p < .01$.

DISCUSSION

The aim of this study was to investigate how the type of social comparison feedback affects test performance related evaluations. Specifically, I investigated if adding local comparison feedback to general social comparison feedback affects the six evaluations given after performing a mental abilities test.

It was hypothesized that local comparison feedback will have an impact on performance evaluation, satisfaction with the performance, mental abilities evaluation, test difficulty evaluation, effort evaluation, and luck evaluation.

The impact of local comparison feedback on test performance related evaluations

The analysis showed that the local comparison feedback affected two variables, namely performance evaluation and the satisfaction with the performance; other domains were unaffected by the feedback. In other words, two hypotheses out of six were confirmed by the data analysis.

Both the performance evaluation and the satisfaction with the performance followed similar pattern, according to the findings of this work. Adding local comparison information to general comparison feedback produced intergroup differences in those variables. Providing information about very good local ranking to a relatively poor general feedback might increase one's evaluation of their performance, and it also seems to increase a person's satisfaction with the achievement. On the other hand, if information about poor local outcomes is provided to a relatively good general ranking, one tends to have lower performance evaluations and is less satisfied compared to a person who only received the feedback about above-average general social comparison information. In a way, these results also seem to confirm the iconic metaphor by Davis (1966) that „it is better to be a big frog in a small pond than a small frog in a big pond“ (p. 31).

Interestingly, though, both of these variables were highly correlated. That might indicate that the distinction between the evaluations regarding performance and satisfaction with the performance might be merely superficial, and it may be the case that these two evaluations are actually the same latent variable.

According to the results, the type of social comparison feedback did not generate differences between the groups in central categories of Weiner's attribution theory (1985, 2010). Specifically, there were no statistically significant differences in the way people attributed

their test outcomes to mental abilities, test difficulty, effort or luck. Despite the fact that the majority of those evaluations had statistically significant correlations with the evaluations given to performance and satisfaction with the performance, none of those variables were affected by the feedback provided to the test.

The fact that there were no intergroup differences in the evaluation of mental abilities, might be caused, in a way, by the experimental design. The methodology used in this work might not have been enough to influence more stable evaluations, such as mental abilities. It is highly plausible that participation in a one-time study, in which a relatively low-stakes test (Abdelfattah, 2010) was used, might not affect evaluations concerning more stable characteristics.

However, the latter idea would still lack in terms of explaining why other attribution variables were not affected by the feedback. One possible reason is that the feedback might affect only the evaluations that are inherent to evaluating the performance as an outcome; other evaluations in this work might have possibly been interpreted as variables that might have *caused* the results. In that light, it might be concluded that local comparison feedback might not affect causal attribution of the performance. However, it is reasonable to remain sceptical, for these results might have been caused by some methodological differences in studying performance related attributions (see *Potential limitations of the study*).

Previous works on the effect of local comparison feedback and test performance related evaluations have not, in their analyses, distinguished between evaluations to performance and ability, as these evaluations were treated as one aggregated variable (Rozgonjuk, 2013; Zell & Alicke, 2009). Because of this, it remained relatively unclear what exactly does the aforementioned type of feedback influence in self-evaluations. This current paper suggests that it would be reasonable to analyze both performance evaluations and ability evaluations in a separate manner. As the results suggest, local comparison feedback might not have an affect on ability evaluation; however, this finding might be explained by the methodological characteristics of the experimental design.

To conclude the results of the study, two hypotheses out of six were confirmed. It was found that local comparison feedback does affect evaluations of performance and the satisfaction with the performance. It does not, however, have an impact on test performance related attribution evaluations to mental abilities, test difficulty, effort or luck. This conclusion addresses all of the three research questions posed in this study.

The contribution of this thesis

The merit of this paper is both theoretical and practical. This study is a valuable contribution to the works that have addressed the influence of local comparison feedback on test performance related evaluations.

Firstly, I have specified the test performance related evaluations that are affected by local comparison feedback. It can be deduced from this paper that the variables that are strictly related to the evaluation of performance might be affected by the type of feedback discussed. It is reasonable to bear in mind that aggregating distinct variables in nature to produce a self-evaluation index might not be appropriate. This issue concerns previous works on the effect of local comparisons on test performance related measures (Rozgonjuk, 2013; Zell & Alicke, 2009).

Secondly, this is the first study to examine the impact of local comparisons on test performance related causal attribution variables (mental ability, test difficulty, effort and luck) proposed by Weiner (1985, 2010). According to this paper, local comparisons do not have an impact on those evaluations.

Thirdly, I have measured the real test performance of participants and it was possible to take the test scores into account in statistical analyses. Earlier works (Rozgonjuk, 2013; Zell & Alicke, 2009) have used tests that did not measure ability, for all of the items were correct, yet difficult enough to create ambiguity that was necessary for the feedback to seem more credible (Guenther & Alicke, 2008). My research showed that it is possible to use an ability-measuring test in combination with manipulated feedback.

Lastly, another theoretical value of this work is that I have reported my research in a detailed fashion that allows for a better replication of this study.

As the previous, theoretical merits of the paper have been discussed, I will now discuss the results in a more practical manner.

As stated earlier, the role of feedback as an essential learning-improving tool is of high value (Hattie & Timperley, 2007; Shute, 2008). Evans (2013) has argued that one objective of providing feedback in educational settings is to decrease social comparisons with surrounding peers; however, it should be noted that comparisons with others might not necessarily be perils of one's achievements. For instance, Lane & Gibbons (2007) have found that comparing oneself with a more able person (upward comparison) might have a positive effect on academic outcomes; on the other hand, those engaging in downward comparisons have been found to have lower academic achievements.

Keeping that in mind, the results of my thesis suggest that it is necessary to acknowledge the role of local comparisons in the classroom. People might not evaluate their opinions, abilities or achievements in an objective manner (Festinger, 1954), therefore, it would be appropriate to consider the role of social comparisons, and local comparisons in particular, while providing and receiving feedback.

As social beings, comparing oneself with others is most likely unavoidable. It has been shown that even mastery-oriented students, pupils whose learning strategy is mainly involved in outperforming themselves and their prior achievements (Elliot, 2005; Van Yperen & Orehek, 2013), are affected by their peers' achievements, or social comparisons (Van Yperen & Leander, 2014).

The results of the findings in this work suggest that the acknowledged and skillful use of impact of local comparisons on self-evaluations could be beneficial in providing feedback in academic contexts. Being mindful about one's goals should be accompanied with awareness of the possible impact of local comparisons that might create bias and distortion in one's self-evaluations.

Potential limitations of the study

I have discussed the possible merits of this paper; however, there are also some limitations that should be taken into account.

Firstly, as mentioned earlier, I have tried to investigate the impact of local comparison feedback on test performance related evaluations by using a low-stakes test in a situation where the participants do not have to face real consequences. It might be the case that the influence of local comparisons in statistically significant models could have reflected situational evaluations.

For better ecological validity, it would be necessary to examine if the effect of local comparison feedback would also be present in high-stakes conditions or in contexts where significant consequences followed. An example would be an exam score, course grade, etc. Would the score of a peer's exam create the local dominance effect in one's self-evaluations, as the theory has proposed? Or perhaps would local comparisons be superseded by the general comparison feedback provided during high-stakes conditions? Virtually, this kind of research question calls for a field experiment.

Another potential limitation of the study was using manipulated feedback with a real mental abilities test. It might be that in some conditions, the presented bogus feedback could

not have been credible. This possible limitation, however, was taken into account as participants who were aware of the real aim of the study were not included in further data analyses.

This paper also investigated the impact of local comparison feedback on test performance related attributions. However, that was done in an unorthodoxically simplistic fashion.

Firstly, it was not measured if the participants reported their outcomes as success or failure; however, satisfaction with the performance was considered to be an equivalent to that. It might be the case that people did not consider their outcomes to be successes or failures *per se*.

Secondly, each of the attribution variables (one's evaluations to mental abilities, test difficulty, effort and luck) were measured with a single, 10-point *Likert*-like scale item. The traditional research of the domain has usually used a multi-itemed, or scale-using, approach. Attribution questionnaires have been developed (Lei, 2009; McAuley, Duncan, & Russell, 1992; Russell, 1982; Sucuoğlu, 2014), but were not used in this study. The main issue behind this was that valid attribution scales have not been translated and adapted into Estonian.

In the future, the impact of local comparisons on test performance related attributions could be investigated by traditional measures, e.g. valid questionnaires. However, these scales will first need to be translated and validated according to the research settings.

Ideas for further research

So far I have discussed the results, the merit and the limitations of this paper. Nonetheless, there are some questions worthy of investigating in subsequent studies.

When taking the situational nature of the experimental design into account, a question emerges: what happens if a person constantly, on several test performance occasions receives local comparison feedback incongruent with general comparisons? In other words, how would the evaluations of a student, who is an above-average member of a high-achieving group be affected? How would poor local comparisons affect the perception of one's self? Would there be an effect on only the situational effects (e.g. after each test) or might it affect evaluations on more timely stable characteristics?

As the reader might recall, the aforementioned speculations may be the case in the BFLPE; BFLPE is a finding that the higher the mean achievements of the school, the lower seems to be its students' academic self-concept (Marsh, 1987; Marsh & Parker, 1984). Perhaps this is caused by several occasions where a student receives poor local comparison

feedback to his or her achievements, and that results in a distorted academic self-concept. The similar idea might be tested in laboratory settings using a within-subjects experimental design (as opposed to between-subjects design used in the current paper). For instance, participants are administered a test, will receive social comparison feedback, and they will then take another test and also receive social comparison feedback. It could be hypothesized that if a person receives below-average local comparison feedback twice, he or she might have lower self-evaluations than a person who receives above-average local comparison feedback on both tests. It is a rough sketch of a possible research idea, but it could be improved and applied.

Another idea is to test participants' behavioral motivation. It has been shown that those who receive positive feedback are willing to solve more complex assignments in subsequent tests (Krenn, Würth & Hergovich, 2013). This could also be examined in the context of social feedback: would those who receive above-average local comparison feedback also be willing to take more difficult tests?

Of course, the connection between local comparison feedback and Weiner's attribution theory (1985, 2010) should be investigated, as I have already mentioned. This is the first research in which it has been tried to figure out the impact of local comparison feedback on test performance related attributions. Even though no connection was found between the type of feedback and the evaluations, further studies should use proper, valid and thorough measures for investigating this problem.

These are just some ideas regarding possible future works.

CONCLUSIONS

I have examined the role of local comparison feedback on test performance related evaluations; more specifically, I tried to investigate whether adding local comparison feedback alters the evaluations of performance, satisfaction with the performance, mental abilities, tests difficulty, effort and luck. The findings suggest that local comparisons might affect situational evaluations, such as performance evaluation and the satisfaction with the performance. However, the type of feedback that was presented in this study might not affect attribution evaluations of mental abilities, test difficulty, effort, and luck. These results have both theoretical and practical implications that should be investigated in the future.

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