Introduction

- Teacher feedback has a powerful influence on student learning, motivation, and achievement (Hattie & Timperley, 2007).
- Social cognitive theory provides a framework for considering the influence of teacher feedback on student motivation and success.
- Bandura (1997) named social persuasions as one of the four key sources of self-efficacy, or the belief in one's capabilities to carry out particular tasks. Students with higher self-efficacy tend to have higher academic achievement and persistence (Pajares & Urland, 2006).
- Positive feedback generally raises self-efficacy and criticism undermines it.
- In the area of mathematics, researchers have shown that certain types of teacher feedback, including positive, ability-focused, and effort-focused feedback, are related to higher student mathematics self-efficacy and competence (Shunk, 1983, 1984; Schweirle, Meyer, & Turner, 2006).
- Researchers have also demonstrated that boys and girls tend to receive similar variety of ethnic backgrounds (81% White, 8% Black, 4% Asian/Asian American, 3% Hispanic).

Purpose of the Study

The purpose of this study was:
- To investigate students’ perceptions of the frequency of four types of teacher feedback (positive, negative, effort-focused, and ability-focused) in the domain of mathematics.
- To determine whether gender differences exist in patterns of perceived feedback.
- To examine the relationship between perceived feedback and students’ mathematics self-efficacy.

Method

Participants

Participants in the study were 200 sixth-grade students (94 girls; 106 boys) from a suburban middle school in the southeastern United States. Participants were from a variety of ethnic backgrounds (81% White, 8% Black, 4% Asian/Asian American, 3% Hispanic).

Measures

Participants completed a survey of mathematics attitudes, which included measures of Teacher Feedback and General Mathematics Self-Efficacy.

Teacher Feedback

- This scale assessed students’ perceptions of the frequency of their mathematics teacher’s positive, negative, ability-focused, and effort-focused feedback and was measured using 22 items developed by Burnett (2002).
- Each item presented students with an example of a statement that their mathematics teacher might say (e.g., “Keep up the good work”). Students rated how often their teacher provides similar feedback to them using mathematics instruction (Likert-type scale, 1 = Never, 6 = Almost always).

General Mathematics Self-Efficacy

- Four-item scale adapted from Bandura (2006) (e.g., “In general, how confident are you in your abilities in math?”). Students rated their self-efficacy on a Likert-type scale (1 = Not at all confident; 6 = Completely confident).

Analyses

- One-way ANOVAs and post-hoc paired-samples t-tests were used to examine mean differences in student perceptions of each type of teacher feedback. Correlations were calculated among each of the variables of interest.
- Independent-samples t-tests were used to examine gender differences in perceptions of frequency for each type of feedback.
- Multiple regression analysis was used to investigate which types of teacher feedback predicted mathematics self-efficacy.

Results

Table 1. Means, Standard Deviations, Cronbach’s Alphas, Zero-Order Correlations, and Paired-Samples t Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>dp</th>
<th>d</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Math Self-Efficacy</td>
<td>5.2</td>
<td>1.0</td>
<td>1.02</td>
<td>1.00</td>
<td>1.02</td>
<td>0.30</td>
</tr>
<tr>
<td>2. Positive Teacher Feedback</td>
<td>4.5</td>
<td>1.2</td>
<td>1.02</td>
<td>1.00</td>
<td>1.02</td>
<td>0.30</td>
</tr>
<tr>
<td>3. Negative Teacher Feedback</td>
<td>2.4</td>
<td>1.1</td>
<td>1.03</td>
<td>1.00</td>
<td>1.03</td>
<td>0.30</td>
</tr>
<tr>
<td>4. Ability-focused Teacher Feedback</td>
<td>3.8</td>
<td>1.5</td>
<td>1.03</td>
<td>1.00</td>
<td>1.03</td>
<td>0.30</td>
</tr>
<tr>
<td>5. Effort-focused Teacher Feedback</td>
<td>3.9</td>
<td>1.4</td>
<td>1.03</td>
<td>1.00</td>
<td>1.03</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note: Zero-order correlations are found below the diagonal. Paired-samples tests are found above the diagonal. Paired-samples tests were not calculated between Math Self-Efficacy and the types of teacher feedback. Cohen’s d = 1.03. Cohen’s dp = 1.02. Cohen’s dp = 1.02. Cohen’s dp = 0.07. Yellow shaded boxes indicate a significant finding (p < .05).

Table 2. Means and Standard Deviations for Teacher Feedback Variables by Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Positive Teacher Feedback</th>
<th>Negative Teacher Feedback</th>
<th>Ability-focused Teacher Feedback</th>
<th>Effort-focused Teacher Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Girls (n = 95)</td>
<td>4.7</td>
<td>1.2</td>
<td>1.02</td>
<td>1.00</td>
</tr>
<tr>
<td>Boys (n = 105)</td>
<td>4.1</td>
<td>1.0</td>
<td>1.01</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: Yellow shaded boxes indicate a significant finding (p < .01).

Table 3. Multiple Regression Results for the Prediction of General Mathematics Self-Efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Teacher Feedback</td>
<td>0.21</td>
<td>1.65</td>
<td>0.10</td>
</tr>
<tr>
<td>Negative Teacher Feedback</td>
<td>-.24*</td>
<td>-2.22</td>
<td>.03</td>
</tr>
<tr>
<td>Ability-focused Teacher Feedback</td>
<td>0.29</td>
<td>2.70</td>
<td>.01</td>
</tr>
<tr>
<td>Effort-focused Teacher Feedback</td>
<td>0.09</td>
<td>0.62</td>
<td>.53</td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01.

Key Findings

- Students who perceived higher amounts of positive, ability-focused, and effort-focused teacher feedback reported higher levels of self-efficacy.
- Students who perceived higher levels of negative teacher feedback reported lower levels of self-efficacy.
- Boys reported receiving significantly higher levels of negative teacher feedback in mathematics than did girls.
- No significant gender differences were found for positive, ability-focused, and effort-focused feedback.
- Student perceptions of the frequency of negative teacher feedback and ability-focused teacher feedback significantly predicted mathematics self-efficacy.

Conclusion

- Students perceive significantly more positive feedback than they do effort, ability, or negative feedback. This is consistent with previous research (Brophy, 1981; Hattie & Timperley, 2007). This finding could indicate a positive perceptual bias on the part of students or could reflect the actual feedback patterns at work in middle school classrooms. We suggest testing this latter possibility with observational approaches.
- Only negative feedback and ability-related feedback predicted self-efficacy. Teachers should attend to their use of negative and ability-focused feedback when attempting to enhance student self-efficacy.
- Unlike many feedback studies that rely on experimental approaches, this naturalistic design that surveyed students in their mathematics classrooms offers a clearer picture of feedback processes that occur in the classroom.
- Future research should examine whether correspondence and specificity between feedback and self-efficacy measures alter these findings (Bandura, 1997).

References


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