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EFFECTS OF VARIOUS FORMS OF BATTING PERFORMANCE FEEDBACK ON MOTIVATIONAL FACTORS AND BATTING PERFORMANCE OF YOUTH BASEBALL PLAYERS

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EFFECTS OF VARIOUS FORMS OF BATTING PERFORMANCE FEEDBACK ON MOTIVATIONAL FACTORS AND BATTING PERFORMANCE OF YOUTH BASEBALL PLAYERS

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ABSTRACT

EFFECTS OF VARIOUS FORMS OF BATTING PERFORMANCE FEEDBACK ON MOTIVATIONAL FACTORS AND BATTING PERFORMANCE OF YOUTH BASEBALL PLAYERS

By

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The present study investigated the effects of different types of batting performance feedback (FB) on certain motivational factors and the batting performance of youth baseball players. The hypotheses underlying this field experiment were that subjects receiving contact average FB would (a) exhibit a greater increase in batting efficacy from early season to late season compared to subjects receiving batting average FB or no FB, (b) show more late-season enjoyment, satisfaction, and persistence compared to subjects receiving batting average FB or no FB, and (c) evidence superior batting performance compared to subjects receiving batting average FB. Subjects were 78 children, predominantly males, between the ages of 10 and 12 years from 9 teams in a community-sponsored youth baseball league. Three teams were randomly assigned to either contact average FB, batting average FB, or no FB. Immediately after each

game from the 3rd game of the season through the 10th, subjects in the two FB groups received sealed index cards containing the appropriate forms of FB. For each team, questionnaires to assess the motivational variables were administered immediately after the 2nd game (early season) and the 10th game (late season). Statistical analyses failed to support any of the hypotheses. However, qualitative data that reflected subjects' behavioral responses to FB supported the study's intrinsic premise that contact average is more appropriate than batting average as a mode of FB for youth baseball players because it is based on a more realistic definition of success and is less ambiguous.

DEDICATION

This thesis is dedicated to my parents, Richard and Vicki Bram, and my sister, Julie Bram, for all of their support.

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CHAPTER I

INTRODUCTION

Nature of the Problem

Among all sports, perhaps baseball is the one whose tradition is most intimately linked with performance statistics. An eloquent explanation for this was provided by Angell (1972) when he wrote that

> baseball, in spite of its grassy spaciousness and apparent unpredictability, is the most intensely and satisfyingly mathematical of all outdoor sports. Every player in every game is subjected to a cold and ceaseless accounting; no ball is thrown and no base is gained without an instant responding judgment--ball or strike, hit or error, yea or nay--and an ensuing statistic. (p. 4)

Indeed, viewing a baseball game on television without being inundated by a plethora of statistics pertaining to the various facets of the game is hardly possible. Furthermore, the almost insatiable appetite that baseball fans, many of whom are children, have for these numbers as fuel for discussion and debate has been

widely recognized (Angell, 1972; Brandmeyer & Alexander, 1981; Goldstein, 1979).

Aside from being fodder for the fan, statistics play another significant role in baseball by providing various types of performance feedback (FB) to the actual participants. For example, players who see that they have a batting average over .300 are presented more positive information about their batting performance than are those who learn that this average is less than .250. Similarly, a pitcher whose earned run average (ERA) is under 3.00 is given more favorable statistical FB about his or her ability to keep opponents from scoring runs than is one whose ERA is over 4.00. Intuitively, it would seem reasonable to suggest that the player receiving the more positive FB regarding a specific game-related task will have greater self-confidence or self-efficacy about his or her ability with respect to that task.

According to Bandura (1977), self-efficacy refers to a measure of the intensity of one's belief that he or she can successfully perform a specific task. In other words, self-efficacy may be understood as situation- or task-specific self-confidence. Bandura contended that, assuming requisite skills and incentives are present, self-efficacy is a critical mediator of one's performance on a task in that it is positively related

to subsequent expenditures of effort and persistence. A further implication is that by influencing the amount of exertion that an individual desires to invest in a task, concomitantly self-efficacy affects the satisfaction and enjoyment the individual derives from the experience of engaging in that task (Scanlan & Lewthwaite, 1986).

Additionally, Bandura indicated that such efficacy expectations are a function of, among other things, the information the individual receives from the environment about performance accomplishments. Weinberg, Gould, Yukelson, and Jackson (1981) supported this notion in their finding that self-efficacy on a leg lift task could be modified through the provision of (bogus) FB regarding prior performance on a related task. In addition, research has shown that immediate verbal FB about performance on a balance task resulted in higher task-specific self-confidence for both male and female children (Corbin, Stewart, & Blair, 1981; Stewart & Corbin, 1988). Furthermore, the study by Stewart and Corbin (1988) found that such FB was particularly effective in enhancing the efficacy expectations of those children exhibiting low preperformance levels of self-efficacy. Though not explicitly examining the effects of FB on self-efficacy, Lenney, Browning, and Mitchell (1980) provided support for Bandura's assertion that information from the environment can mediate

expectations of efficacy. Specifically, Lenney et al. determined that the preperformance self-confidence of both male and female subjects regarding performance on an impending test battery was higher when the evaluation guidelines provided were clear than when they were ambiguous.

Because its spaciotemporal features are readily conducive to the systematic scoring of each play and thus to the formulation of various statistics, baseball appears to be a sport whose environment is ideal to provide participants with performance FB. Traditionally, the most commonly employed statistic for measuring offensive performance in baseball has been batting average, which reflects the relative frequency with which a player gets base hits. However, the goal of getting base hits (and thus increasing batting average) may not be appropriate for very young players. That is to say, the emphasis on where the ball travels after being hit may obscure the more immediate challenge: making contact with the ball. The acknowledgment of the extreme difficulty inherent in simply striking a moving round ball with a round bat has perhaps been the primary point of agreement among the experts representing the divergent schools of thought about hitting style (Lau & Glossbrenner, 1980; Williams & Underwood, 1970). As an alternative to batting

average, Doumit (1985) proposed the contact average, a statistic measuring the relative frequency with which a player strikes the ball. Doumit implied that by redefining batting success as making contact, the baseball environment is restructured in such a way as to give players a heightened sense of control over outcomes and a greater chance of feeling successful about their hitting capabilities. Nevertheless, the issue of whether or not providing contact average FB actually enhances young baseball players' batting efficacy, batting performance, enjoyment, satisfaction, and persistence had not yet been formally researched prior to the present study.

Statement of the Problem

The principal purpose of this study was to investigate the effects of differing batting statistical FB (contact average, batting average, or no FB) on the batting efficacy, actual batting performance, enjoyment, satisfaction, and persistence of youth baseball players. Specifically, the hypotheses underlying this inquiry were that subjects receiving contact average FB would (a) evidence a greater increase in batting efficacy from early in the season to late in the season compared to subjects receiving batting average FB and subjects receiving no FB, (b) show higher late-season indicators

of enjoyment of the baseball experience, enjoyment of batting, satisfaction with batting performance, and persistence compared to subjects receiving batting average FB and subjects receiving no FB, and (c) exhibit superior late-season (total) batting performance measures--contact average and batting average--compared to subjects receiving FB on their batting average.

Delimitations

This study was delimited to youth baseball players between the ages of 10 and 12. The results, therefore, may not be pertinent to younger players such as those in T-ball leagues or to older players such as those in high school, college, or professional leagues. Additionally, because of the easy adaptability of performance statistics to FB-giving in baseball and the unique role of statistics in the heritage of the game, results must not be universalized to other sports with the possible exception of softball.

Basic Assumptions

Underlying the execution of this study were assumptions that the respective instruments employed to assess batting efficacy, enjoyment of baseball, enjoyment of batting, satisfaction with batting performance, and persistence are each both valid and reliable. These assumptions became strengthened

considerably, however, with the acknowledgment that these instruments have precedent in past youth sport research. For instance, in the present thesis one instrument that was used to assess batting efficacy was a batting-specific adaptation of the physical subscale of Harter's (1982) Perceived Competence Scale for Children (see Appendices A and B). Other studies that have modified Harter's physical subscale include those that have gauged children's perceived competence in baseball/softball, soccer, and a motor competence battery (Brustad & Weiss, 1987; Feltz & Brown, 1984; Ulrich, 1987). The other instrument that was used to measure batting efficacy in the present study as well as those that were used to assess satisfaction and persistence were each straightforward, one-question Likert scale items (see Appendices A and B). This direct-styled approach is in the same vein as that employed by Smith, Smoll, and Curtis (1979) to assess a series of comparable attitudinal variables in youth baseball players. Finally, the two questionnaire items that were used in tandem to measure enjoyment in the present study were direct modifications of the two items that were employed by Scanlan and Lewthwaite (1986) to ascertain the enjoyment of youth wrestlers (see Appendix B).

Definition of Terms

To facilitate the comprehension of the different types of statistical performance FB that were provided to subjects, the following baseball-related constructs are defined in the context of this study:

At bat--was logged any time a subject appeared at the plate except when receiving a base on balls, being hit by a pitch, executing a sacrifice bunt or sacrifice fly, or reaching first base via catcher's interference.

Base hit or hit--was credited to a player who made contact with the ball and reached base, except on those occasions that reaching base was the result of a fielding error. Criteria for judging an error are presented in Appendix C.

Contact--occurred whenever a player hit the ball in fair territory regardless of whether that player reached base safely or not.

Batting average--was computed by dividing a player's number of base hits by number of at bats. This statistic was rounded off to the nearest one-thousandth (e.g., .321).

Contact average--was computed by dividing a player's number of times making fair contact by number of at bats. This statistic was also rounded off to the nearest one-thousandth.

No-feedback group--referred to subjects who did not receive index cards containing FB on batting performance.

Limitations

A number of factors threatened the internal validity of this study. For example, random assignment to the three treatment groups was imperfect in that it was done by team rather than by subject. Other threats to internal validity included that FB (a) was not provided immediately after the game to which it referred but, rather, after the following game, (b) was not actually computed by coaches (who were also not allowed access to the FB statistics tabulated by experimental assistants), and (c) was disseminated to individual subjects on a private basis as opposed to the typical scenario in which FB is listed for all players on a single-page handout. As a result of these intrinsic limitations, any changes from early season to late season in batting efficacy for any of the three treatment groups and any differences across groups in late-season measures of enjoyment, satisfaction, persistence, and batting performance could not be attributed entirely to the mode of FB provided.

CHAPTER II

REVIEW OF LITERATURE

The effects of various forms of statistical performance FB upon motivational factors and performance in athletics have not been explicitly investigated in previous research. Therefore, in order to construct a framework for exploring this topic it will be necessary to draw upon the literature of related research areas and synthesize relevant findings. As such, the first body of research that is examined is that pertaining to the relationship between knowledge of results (KR) and motor performance. Next, self-efficacy theory is reviewed briefly, and studies relating FB or KR to self-efficacy are discussed. In the final section of this review, important findings regarding interrelationships among KR, self-efficacy, and performance are summarized and integrated with pertinent research from the youth sport literature.

KR and Motor Performance

In the literature pertaining to motor behavior, a distinction is made between the terms FB and KR. As opposed to FB which refers to any type of information

about a response that an individual receives through his or her senses, KR is information about response outcome that the individual derives from an external source (Magill, 1985). Because the present thesis focuses on the effects of statistical performance information that is provided externally, past research related to KR, rather than that related to FB, is relevant to this review.

Theoretical significance of KR. The importance of KR in the realm of motor behavior is underscored by the fact that it is considered to be an integral component within two distinct theories of motor learning: Adams' (1971) closed-loop theory and Schmidt's (1975) schema theory. Briefly, closed-loop theory states that in learning a motor task an individual cultivates a reference mechanism or perceptual trace which uses sensory information during movement to compare the actual response with the correct response. Whenever there is a discrepancy between the actual and correct responses, messages are sent to modify the response. According to Adams, KR about the correctness of a completed response plays a significant role in the strengthening of the perceptual trace over time with respect to a given task.

Another theory of motor learning, Schmidt's (1975) schema theory, explains that an individual's response on a motor task is a consequence of his or her integration of accumulated information regarding the initial conditions of the response, response specifications, sensory consequences of the response, and the response outcome. In this context, KR functions as the means for providing the individual with information about response outcome.

Both closed-loop theory and schema theory have provided a conceptual basis for subsequent research concerning the effects of KR on motor learning and performance and a framework for the analysis of earlier research in this area. According to Salmoni, Schmidt, and Walter (1984), however, within this body of research there has been a tendency to confuse findings showing support for KR's effects upon motor performance with those showing support for its effects upon motor learning. Because learning refers to relatively permanent behavioral effects of a treatment (e.g., provision of KR) and performance refers to effects which may or may not be permanent (i.e., may be only temporary), researchers should be clear with respect to the specific dependent variable they are assessing. Salmoni et al. indicate that only those studies which allow for a transfer test in which both the treatment

and control groups are returned to equal levels of KR following an acquisition phase (in which treatment and control groups received different levels of KR) can show support for the existence of a relationship between KR and motor learning. In light of the focus of the present study, which is on KR's effects on youth baseball players' batting performance, the present review has focused on studies that have investigated the relationship between KR and performance. Nevertheless, an important point to recognize when these studies are reviewed is that motor performance and motor learning are not mutually exclusive events. That is to say, though not to be directly inferred, when KR is demonstrated to influence performance a certain degree of learning may have occurred as well.

Research on the relationship between KR and motor performance. Research has generally found support for a relationship between KR and motor performance (e.g., Elwell & Grindley, 1938; Gibbs & Brown, cited in Sage, 1984; Stelmach, 1970; Thorndike, 1927; Trowbridge & Cason, 1932). A classic early research study relating to KR and motor performance was that conducted by Thorndike (1927) in which blindfolded subjects engaged in a line drawing task. Specifically, subjects were told to draw a series of lines varying among 3, 4, 5,

and 6 in. Constituting a treatment condition, 24 subjects received verbal KR after each response. For these subjects, if their lines were within 1/8 in. of the target length when the target was 3 in. or within 1/4 in. when the target length was 4, 5, or 6 in., they were given the KR "right"; otherwise, they were presented the KR "wrong." An additional 6 subjects who received no such verbal KR after each response served as the control group. Results indicated that the group receiving KR showed more improvement in the accuracy of their line drawing than did the no-KR group. Thorndike concluded that this occurred because the KR indicating that a response was "right" acted as a reward which served to reinforce the correct response for subjects in the treatment group. Such a view is consistent with fundamental theories of animal behavior (e.g., Skinner, 1961).

Subsequent researchers sought to demonstrate that providing KR could function to enhance motor performance in ways other than simply as a reinforcement. One study which was a direct response to Thorndike's (1927) conclusion was that undertaken by Trowbridge and Cason (1932). Essentially, Trowbridge and Cason employed the same line drawing task used by Thorndike, except that only 3 in. lines were specified as the target. In this study, subjects were assigned to one of four groups:

(a) a control group who received no KR whatsoever; (b) a group who were told nonsense syllables after each response; (c) a KR group who were told "right" after each response in which they were within 1/8 in. of the target and "wrong" otherwise; and (d) a detailed KR group who were told the extent of their error after each response (e.g., "plus 3" if the line was 3/8 in. longer than the target).

Accuracy scores over 100 trials revealed that the detailed KR group made the fewest errors, followed in ascending order of error frequency by the right-wrong KR group, the control (no KR) group, and the nonsense group. Therefore, while Thorndike's (1927) finding that the right-wrong KR group exhibited performance superior to that of the control (no KR) group was replicated, the detailed KR group performed even better than the right-wrong KR group. Another important finding in this study was that the nonsense group performed worse than the control (no KR) group. Trowbridge and Cason concluded that these results support the notion that the provision of meaningful KR improves performance in that it communicates useful error correction information to the performer. Further support for this informational function of KR has been provided by subsequent studies involving other motor tasks (Bilodeau, Bilodeau, &

Schumsky, 1959; Elwell & Grindley, 1938; Stelmach, 1970).

In addition to the studies that have found that the provision of KR facilitates heightened motor performance through reward and informational processes, some studies have indicated that KR may act to improve performance by serving as a motivator (e.g., Elwell & Grindley, 1938; Gibbs & Brown, cited in Sage, 1984; MacPherson, Dees, & Grindley, 1948). For clarification, a motivator may be understood as a factor which influences the initiation, maintenance, or intensity of behavior (Magill, 1985). Elwell and Grindley (1938) reported two experiments which supported the notion of KR's motivational effects upon performance. In both experiments, subjects engaged in a two-hand coordination task in which they used two levers in an attempt to line up a spot of light in a bull's-eye. For each trial, the closer the light was to the bull's-eye, the higher the score. In the first experiment, subjects were given 20 trials in succession on each of 10 consecutive evenings (for a total of 200 trials) in which they received visual KR by being allowed to see where the spot of light was. At the beginning of the 11th session and continuing through the 15th session, subjects attempted the task with the light turned off, thereby eliminating their source of KR, for an additional 100 trials. In the second experiment,

subjects performed the task with the visual KR for the first 90 trials and then without it for an additional 30 trials. Furthermore, throughout both experiments, at various times between trials the investigators sought from subjects "introspectives" or comments about what they were thinking and feeling with respect to the task or their performance.

The results of these two experiments indicated that when KR was provided, subjects' performance showed improvements and when KR was removed, their performance deteriorated. Taking this finding by itself, the researchers acknowledged that some support had been provided for the informational value of KR. According to Elwell and Grindley (1938), however, the introspective reports shed light on another phenomenon of KR. This qualitative data revealed that when KR was removed and performance scores declined subjects expressed negative affect that was not evident prior to the change in conditions. Specifically, the withdrawal of KR was accompanied by expressions of boredom, displeasure, and lack of confidence in performance. Elwell and Grindley considered this negative affect to reflect a decrease in motivation. Thus, Elwell and Grindley argued that the presentation of KR operates to enhance performance through its motivational capacity. Other studies have corroborated this view of the

relationship between KR and motor performance (Gibbs & Brown, cited in Sage, 1984; MacPherson et al., 1948). Furthermore, an extensive review of literature by Locke, Cartledge, and Koeppel (1968) suggested that KR's motivational effects are a function of the goals the performer sets in response to the KR received.

The studies that have been discussed thus far have shown that considerable evidence exists that the provision of KR is related to heightened motor performance through KR's reinforcement, informational, or motivational value. In fact, the support for the KR-performance relationship has been strong enough to convince some motor behavior commentators to espouse the merits of KR as the most important variable that can be manipulated to influence an individual's progress on a performance task (Bilodeau & Bilodeau, 1961; Holding, 1965).

Before concluding this discussion of the relationship between KR and motor performance, attention will be shifted to the issue of KR precision which "concerns the amount of specific response outcome that is given a subject" (Magill, 1985, p. 299). For example, with respect to a task involving blindfolded subjects' drawing lines to a specified target length, verbal KR could assume various levels of precision or specificity. That is to say, following a subject's

response, KR could be presented as "too long" (qualitative and imprecise), "too long by 3 inches" (quantitative and more precise), or "too long by 3.74 inches" (quantitative and very precise). Although a number of studies have shown no effects of manipulating KR precision on motor performance (Gill, 1975; Jensen, Picado, & Morenz, 1981; Newell & Kennedy, 1978; Shapiro, 1977; Smoll, 1972; Thomas, Mitchell, & Solomon, 1979), many others have found that increased KR precision is related to enhanced performance up to a point at which KR becomes too detailed, providing the performer with no further useful information and often overloading the performer's information-processing capacity (Bilodeau, 1953; Hunt, 1961; Magill & Wood, 1983; McGuigan, 1959; Newell & Carlton, 1980; Rogers, 1974; Salmoni, Ross, Dill, & Zoeller, 1983). According to the latter set of researchers, then, when KR becomes too precise, rather than improving, performance may fail to get better and may possibly decline. Up to that optimal level, however, more precise KR is generally beneficial to motor performance.

Self-Efficacy and KR

Overview of self-efficacy theory. Before addressing the relationship between KR and self-efficacy, a brief review of self-efficacy theory is

warranted. According to Bandura (1977), self-efficacy is essentially the self-confidence an individual possesses with respect to a particular situation or task. More specifically, self-efficacy is a measure of the intensity of an individual's conviction that he or she can perform a specific task. Bandura maintains that, assuming requisite skills and incentives are present, self-efficacy is a critical mediator of one's performance on a given task.

Bandura's premise that self-efficacy influences performance has inspired a great deal of research in many areas of sport and exercise. In a recent review, Feltz (1988) indicated that, taken together, these studies, which were conducted in a variety of settings that involved sport and motor skill, show strong support for the existence of a considerable relationship between self-efficacy and motor performance. Specifically, statistically significant correlations between self-efficacy and performance have been found with respect to such diverse activities as tennis, back diving, leg endurance tasks, marathoning, hand grip strength tasks, gymnastics events, and golf putting (e.g., Barling & Abel, 1983; Feltz, 1982; Gayton, Matthews, & Burchstead, 1986; Gould & Weiss, 1981; Kavanagh & Hausfeld, 1986; McAuley & Gill, 1983; Weinberg, Gould, & Jackson, 1979; Woolfolk, Murphy, Gottesfeld, & Aitken, 1985). In

addition to this correlational evidence, some studies have employed methods of path analysis to determine whether there is any causality involved in the relationship between self-efficacy and motor performance (Feltz, 1982; Feltz & Mugno, 1983; McAuley, 1985). Overall, these analyses have ascertained that self-efficacy is an important, though not exclusive, determinant of performance.

According to Bandura (1977), an individual's level of self-efficacy is primarily a function of his or her cognitions regarding information received from any or all of four sources: personal performance accomplishments, vicarious experiences, verbal persuasion, and physiological arousal. The small body of sport-related research that has thus far investigated the informational effects of verbal persuasion (and the comparable technique of teaching subjects to reinterpret arousal) and physiological (and emotional) states has failed to generate unequivocal support for either variable's having a strong influence on self-efficacy (Feltz, 1982; Feltz & Mugno, 1983; Kavanagh & Hausfeld, 1986; Weinberg, 1986; Wilkes & Summers, 1984; Yan Lan & Gill, 1984).

Studies examining the effects of information provided through vicarious experiences upon self-efficacy have, however, shown support for this aspect of

Bandura's theory in the realm of sport and physical activity. Specifically, these studies have employed the vicarious experiences of modeling, imagery, and the provision of information regarding the ability of an opponent to alter subjects' efficacy expectations in an array of activities (e.g., Corbin, Laurie, Gruger, & Smiley, 1984; Gould & Weiss, 1981; Weinberg et al., 1979).

Nevertheless, the type of information which has been shown consistently to be the most powerful influence on self-efficacy is that which the individual derives directly from the environment about performance accomplishments (Desharnais, Bouillon, & Godin, 1986; Feltz, Landers, & Raeder, 1979; McAuley, 1985; Weinberg, Sinardi, & Jackson, 1982). One of the ways that an individual can receive such information is through the explicit provision of KR, whose relationship with subsequent motor performance was discussed earlier in this chapter. Bandura (1986) sketched the process by which KR influences self-efficacy when he noted that "results of actions [KR] convey signs of progress which can be either encouraging or disheartening depending upon the direction of performance change" (p. 239).

Prior to concluding the present overview of self-efficacy theory and embarking upon the discussion of evidence of the relationship between self-efficacy and

KR, an alternative conceptualization of self-confidence --that of perceived competence--will be introduced. Pioneered by Harter (1978), perceived competence is a construct that is analogous to self-efficacy, differing principally in that its use is restricted to studies of children and that it refers to a relatively more general sense of self-confidence. Contrary to Bandura's self-efficacy which is fundamentally one's task-specific self-confidence, Harter's perceived competence refers to one's mastery expectations as they exist within separate cognitive, social, and physical domains. According to Harter, a child's perceived competence in a domain evolves through reinforcement and other interactions with the environment. Essentially, Harter's model states that the more a child perceives himself or herself to be competent within one of the domains, the more he or she will be inclined to engage in and strive to display competence at a given task within that domain. According to Feltz (1988), both Bandura's concept of self-efficacy and Harter's concept of perceived competence are viable theoretical frameworks in which to study self-confidence in sport. Research in sport has shown that when sport-specific modifications of Harter's scale are used, perceived competence is predictive of actual performance ability (Feltz, 1988). Because Harter's measurement of perceived competence is

psychometrically sound and is derived from developmental theory, Feltz recommends its use for research on the self-confidence of children.

Research on the relationship between KR and self-efficacy. There is a paucity of research that has been conducted for the express purpose of illuminating the relationship between KR and self-efficacy in motor performance. Nevertheless, some studies which set out to investigate other issues have spawned results which support the existence of such a relationship (Corbin et al., 1981; Stewart & Corbin, 1988; Weinberg et al., 1981). It should be noted, though, that in most of this literature the term KR is rarely employed; instead, the same basic concept tends to be referred to as FB. For this discussion, then, the distinction made earlier between KR as external information and FB as sensory information is not relevant.

Weinberg et al.'s (1981) study which sought to examine the effects of preexisting and manipulated self-efficacy on competitive motor performance yielded some results which are germane to the present discussion. In this investigation, male and female college students served as subjects. The specific portion of this study that is pertinent here is the manipulation of self-efficacy which occurred prior to subjects' performing

the actual task, a leg lift endurance competition. To create a high-manipulated self-efficacy condition for the competitive leg lift, half of the subjects were (a) told that their opponent (actually a confederate) had strained knee ligaments and (b) given bogus FB that they performed better than their opponent on an isokinetic leg-strength machine, a task related to the one in which they would later engage. In the low-manipulated self-efficacy condition, the other subjects were (a) told that their opponent (also a confederate) was a college track athlete and (b) given bogus FB that they performed worse than their opponent on the isokinetic leg-strength machine. As such, it was the second part of this manipulation that involved providing information (albeit deceptive) to subjects about performance accomplishments on a task similar to the one in which they were about to engage. To assess whether or not the intended manipulation occurred, each subject was asked to rate from 0% to 100% his or her expectation of enduring longer than the opponent on the ensuing leg lift task. The investigators determined that the high-manipulated self-efficacy group had significantly higher efficacy expectations than did the low-manipulated self-efficacy group. Thus, Weinberg et al. provided some support for the effect of information regarding performance accomplishments upon self-efficacy.

Additional evidence was implicit in Corbin et al.'s (1981) study of gender differences with respect to how children's self-confidence in motor ability is influenced by the performance FB they receive. In the study, the motor task in question was one that required balancing on a stability platform. The procedure began as subjects viewed a brief film of a same-age boy and girl performing on the balance task. Next, subjects were randomly assigned within each gender group to either a FB or no-FB condition. After assignment, subjects were given three trials on the balance task but were not allowed to see their actual performance scores. Those subjects in the FB group received positive verbal performance FB during or after each of the trials (the same FB schedule was given to all subjects in this group), and those in the no-FB group received no information about the quality of their performance. Before each trial and after the last one, subjects were asked to make performance predictions on a 7-point Likert scale. These predictions were used as measures of self-confidence or self-efficacy. Though the results relevant to the present review were not reported by Corbin et al., a more recent study by two of the same authors indicated that in the 1981 study they "found that immediate feedback concerning performance on a balance task enhanced the confidence of children, [and]

the effect was no different for girls than for boys" (Stewart & Corbin, 1988, p. 163).

Stewart and Corbin (1988) illuminated the relationship between performance accomplishment FB and self-efficacy as well. This study was an extension of that by Corbin et al. (1981) and sought to determine whether boys' and girls' self-confidence is affected differently by performance FB when preperformance self-confidence is held constant. As in the original study, subjects viewed a short film of a boy and girl performing the balance task. After the film, subjects were asked to predict their own performance on the balance task using a 7-point Likert scale. This prediction would serve as a measure of preperformance self-confidence.

Within each gender group, subjects were randomly assigned to either a FB or no-FB condition. In addition, within each condition subjects were grouped for analysis according to whether they indicated high or low preperformance self-confidence. Subjects were given three trials and were not informed of their score on any of them. Members of the FB group were given (qualitative) positive verbal performance FB after each trial, and those of the no-FB group were given no such information. After each trial, including the last one, subjects made performance predictions for the next trial

on the same 7-point scale. The final prediction was used as the assessment of each subject's postperformance self-confidence.

A 2 x 2 x 2 (Preperformance Self-Confidence x FB x Gender) design was created to analyze changes in the dependent variable, postperformance self-confidence. This analysis revealed a significant FB main effect, indicating that subjects who received FB had higher postperformance self-confidence than those who did not receive such FB. Also found was a Preperformance Self-Confidence x FB interaction which indicated that those subjects low in preperformance self-confidence benefited the most from FB. According to the authors, the essential implication of the study was that immediate FB was especially helpful to subjects who lacked confidence regardless of the subjects' gender.

Because research relating FB or KR to self-efficacy is scant in the motor behavior literature, it may be helpful to explore one study conducted outside this realm that may have relevance to sport nevertheless. Lenney et al. (1980) investigated the possibility that the guidelines an individual is given regarding performance FB can affect his or her self-evaluations of performance as well as performance itself. Thus, unlike the studies discussed previously, the study by Lenney et

al. did not allow for an examination of the effects of providing FB on self-efficacy.

Lenney et al. (1980) asked male and female college students to complete a test battery assessing various intellectual skills. Subjects were randomly assigned to one of three conditions based on the type of evaluation guidelines they would receive prior to taking the test: (a) ambiguous guidelines; (b) clear guidelines; and (c) clear guidelines including examples of superior performance. After subjects completed the test, three questionnaire items were used to assess subjects' self-evaluation of performance. The important finding with respect to the present discussion was that subjects in the clear evaluation guideline group showed higher postperformance self-evaluation as well as higher actual performance scores than those in the ambiguous guideline group.

Summary and Discussion

In order to facilitate a clear understanding of the rationale underlying the present investigation, the important findings of the present review are summarized, and their implications in general and with respect to youth sports are discussed in this section. First, a number of studies have shown that the provision of KR is related to enhanced performance on various motor tasks

(Bilodeau et al., 1959; Elwell & Grindley, 1938; Gibbs & Brown, cited in Sage, 1984; Locke et al., 1968; MacPherson et al., 1948; Stelmach, 1970; Thorndike, 1927; Trowbridge & Cason, 1932). Additionally, these studies accounted for this relationship by citing reinforcement, informational, and/or motivational functions inherent in providing the KR. With respect to the research conducted in the area of KR precision, there is considerable support for the notion that increasingly precise or specific KR is related to improvements in motor performance up to some optimal level of KR precision at which point further precision has either a neutral or negative effect upon performance (Bilodeau, 1953; Hunt, 1961; Magill & Wood, 1983; McGuigan, 1959; Newell & Carlton, 1980; Rogers, 1974; Salmoni et al., 1983).

While this body of research on KR precision has examined the effects of different levels of specificity of a single KR performance standard (e.g., accuracy of performance) on motor performance, the possibility that motor performance could be influenced by varying the actual performance standard (e.g., KR on accuracy of performance versus KR on speed of performance) has received little, if any, research attention. The studies that have been discussed have been conducted predominantly in laboratory settings, using fabricated

tasks in which goals were univocal (e.g., direct a spot of light on a bull's-eye). When a goal is clear-cut as such, undoubtedly KR will be based (at any of various levels of specificity) upon how close the performer comes to attaining that goal on a given trial. However, in many applied motor tasks, particularly sports in which there are often a variety of performance statistics recorded, there may be multiple potential goals, and it is not always clear which one(s) should be the basis for the KR that performers will receive. In football, for example, a quarterback may receive KR on passing efficiency based upon the percentage of total passes that were completed or KR based upon the number of yards gained per pass attempt. Each of these performance standards is a legitimate measure of passing efficiency, but each may depict a somewhat different characterization of performance. As such, an individual quarterback might respond differently depending on the type of KR (completion percentage or yards per pass attempt) provided, and this could affect subsequent performance.

Another task in which goals and KR may be expressed in a multiplicity of forms is batting in baseball. Traditionally, the most commonly employed measure (and therefore most common basis for KR) of batting performance has been batting average, an expression of

the relative frequency with which a player gets base hits. However, the goal of getting base hits to increase batting average may not be appropriate for young players. That is to say, the emphasis on where the ball travels after being struck may obscure the more immediate challenge, which is making contact with the ball. After all, batting experts are in agreement that using a round bat to strike a moving round ball is an extremely difficult task, especially for children (Lau & Glossbrenner, 1980; Williams & Underwood, 1970).

As an alternative to batting average, Doumit (1985) proposed the contact average, a measure of the frequency with which a player makes contact with the ball, as a gauge of batting performance and a basis for providing KR. Based on the assumption that making contact is, in and of itself, a reasonable goal for very young baseball players, contact average appears to be a more precise mode of KR than batting average. In other words, while contact average gives the child information that reflects strictly how often he or she strikes the ball, batting average reflects the outcome of many variables, such as the fielding ability of the opposing team and subjective judgments of the official scorer, that are not directly related to the child's own performance. Furthermore, in light of Lenney et al.'s (1980) findings with respect to the clarity of performance evaluation

guidelines, contact average may be viewed as less ambiguous than batting average for the same reason. Nevertheless, whether or not changing the batting performance standard underlying KR from batting average to contact average has any effect on the batting performance of young players has not been formally researched in the past. Thus, the present study investigated, among other things, possible dissimilar effects of administering these two types of KR on the batting performance of youth baseball players.

Altering the basis of KR may have implications for the self-efficacy of these young players as well. In introducing the concept of contact average, Doumit (1985) implied that by redefining success as making contact (in lieu of getting base hits), the baseball environment is restructured in such a way as to give players a heightened sense of control over outcomes and a greater chance to feel successful about their batting capabilities. Based on the studies discussed earlier that showed that the KR or FB an individual receives about performance accomplishments influences his or her self-efficacy, this seems quite plausible (Corbin et al., 1981; Stewart & Corbin, 1988; Weinberg et al., 1981). Because a player with a relatively high contact average need not have a high batting average, the type of KR a batter receives may have a serious impact upon

how he or she perceives past performance and approaches future performance. A second purpose of the present study was, then, to determine whether the type of KR provided (contact average, batting average, or no FB) has any effect on the batting efficacy of the youth baseball players.

That the youth baseball environment can indeed be modified to foster greater positive affect among participants is supported by an intervention study conducted by Smith et al. (1979) which investigated the relationship between the level of positive reinforcement provided by youth baseball coaches and the self-esteem of their players. Specifically, this study revealed that players of coaches who had engaged in a preseason coach effectiveness training program--which explicitly presented coaches with the goal of increasing their rate of positive reinforcement to 25% of their total coaching responses during the season--were significantly higher in postseason general self-esteem compared to players of coaches who had not been involved in the training program. Furthermore, players of coaches who had participated in the training program evidenced significant increases in self-esteem from the previous season, while those players of coaches who had not participated in the program did not. These findings, which indicate that particular aspects of the youth

sport environment may be recasted to create a more positive experience for the participants, suggest that in the present thesis, altering KR to a more appropriate form could enhance the batting efficacy of the subjects.

Regarding self-efficacy's association with other motivational factors, Bandura (1977) contended that self-efficacy is positively related to subsequent expenditures of effort and persistence. This notion is consistent with Harter's (1978) discussion of perceived competence, as being positively related to one's inclination to engage in and persevere at a task.

Employing Harter's (1978) model as a framework, some studies have investigated the possibility of such a connection between perceived competence and persistence in youth sport. Specifically, these studies compared the perceived physical competence of children who continue to participate and that of those who have discontinued participation. Supporting the existence of a positive relationship between perceived competence and persistence, Feltz and Petlichkoff (1983) found that subjects persisting in interscholastic athletics were significantly higher in perceived competence than those who had dropped out. Additionally, Burton and Martens' (1986) study comparing current and former youth wrestlers yielded similar results. Based on this evidence, it seems logical that another purpose of the

present study was to determine whether any KR effects on efficacy have implications for persistence in baseball.

A final issue related to self-efficacy or perceived competence that was explored in the present study is based upon Scanlan and Lewthwaite's (1986) inquiry concerning factors that predict the enjoyment experienced by youth wrestlers. Specifically, through the use of a wrestling-specific adaptation of Harter's (1978) perceived competence model, these researchers determined that those athletes possessing higher levels of perceived competence enjoyed the wrestling participation experience significantly more than did those with lower perceived competence. Emanating from this finding, the present study attempted to determine whether any effects of KR on batting efficacy had significant ramifications for the amount of enjoyment of baseball and batting experienced by the youth baseball players being studied. Related to enjoyment, a final variable whose relationship with KR and batting efficacy was investigated in the present thesis was that of satisfaction with batting performance.

To reiterate, in view of the literature reviewed and discussed, the present study of youth baseball players was undertaken to investigate the relationship between KR or FB and six different performance and motivational variables. In particular, the

relationships that were studied include those between the types of batting performance FB (contact average, batting average, and no FB) provided and (a) batting performance, (b) batting efficacy, (c) persistence in baseball, (d) enjoyment of the baseball participation experience, (e) enjoyment of batting, and (f) satisfaction with batting performance.

CHAPTER III

METHOD

This study investigated the effects of different batting performance FB conditions (contact average, batting average, and no FB) on the batting performance, batting efficacy, and levels of enjoyment, satisfaction, and persistence of youth baseball players. Specifically, the hypotheses underlying this inquiry were that subjects receiving contact average FB would (a) exhibit a greater increase in batting efficacy from early season to late season compared to subjects receiving batting average FB and subjects receiving no FB, (b) show higher late-season indicators of enjoyment of the baseball experience, enjoyment of batting, satisfaction with batting performance, and persistence compared to subjects receiving batting average FB and subjects receiving no FB, and (c) evidence superior measures of batting performance in late season (cumulative batting performance) compared to subjects receiving batting average FB.

Subjects

Participants in this study were 101 children between the ages of 10 and 12 years (based on age on August 1, 1989) from 9 teams in a community-sponsored youth baseball league in a small city in mid-Michigan. Of this total, however, only 78 subjects were included in the analysis, as those individuals whose data were incomplete were discarded from consideration. Subjects whose data were incomplete either were not present for all of the testing sessions or completed questionnaires improperly. The sample possessed a mean age of 11.04 years (*SD* = .81), ranged in academic grade from 3rd to 7th, and was approximately 95% male and 5% female.

Three teams were randomly assigned to each of the following treatment conditions: contact average FB, batting average FB, and no FB. However, the players on these teams, not the teams themselves, were the unit of analysis in this study. In the final analysis, there were 29 subjects in the contact average FB group, 25 in the batting average FB group, and 24 in the no-FB group. In addition, Table 1 contains a breakdown of the number of subjects in each treatment group by age. Postseason examination of the win-loss record of each of the participant teams revealed general consistency across groups. The following are the composite winning percentages by group: .444 for the contact average FB

Table 1

Number of Subjects per Treatment Group by Age.

Age in Years	Treatment Group			
	Contact Average FB (n = 29)	Batting Average FB (n = 25)	No-FB (n = 24)	Total (N = 78)
10	8	7	9	24
11	13	6	8	27
12	8	12	7	27

group, .500 for the batting average FB group, and .428 for the no-FB group.

Design

To test the first hypothesis, regarding the effect of FB upon batting efficacy, a 3 x 2 (Group x Pre/Post) factorial design was employed. The first factor was the contact average FB group versus the batting average FB group and the no-FB group. The second factor was an early-season versus late-season repeated measure. In addition, a posttest-only control group design was used to test the second hypothesis, concerning the effect of FB on enjoyment, satisfaction, and persistence. A similar posttest-only design was employed to test the third hypothesis, regarding the effect of FB upon batting performance.

Dependent Measures

Batting efficacy. In an attempt to offset the bias that any one measure may have had, multiple measures of batting efficacy were used on both the early- and late-season tests (Campbell & Fiske, 1959). The microanalytic approach to measuring self-efficacy as suggested by Bandura (1977) was not employed, however. Because batting performance was not assessed on a game-to-game basis, it was not appropriate to assess batting efficacy in such a game-specific manner.

One such measure that was employed, perceived batting competence, was based upon the physical subscale of Harter's (1982) Perceived Competence Scale for Children. Three of the items on Harter's physical subscale were adapted to baseball batting (see Appendices A and B). Specifically, subjects were presented with an inventory containing the following three items of paired statements reflecting a social comparison of batting ability: "Some kids do very well at batting, BUT others don't feel that they are very good when it comes to batting"; "Some kids wish they could be a lot better at batting, BUT other kids feel that they are good enough"; and "Some kids feel they are better than others their age at batting, BUT other kids don't feel they can bat as well." For each pair of statements, each subject selected the one believed to be more personally applicable. Once this choice was made, the subject was asked to indicate whether the chosen statement was sort of true or really true for him or her. Each of the three items was scored such that 1 denoted the lowest level of batting efficacy, and 4, the highest. (Scoring keys are presented in Appendices A and B.) For each subject, the three scores were summed and averaged, yielding his or her measure of perceived batting competence.

The additional measure of batting efficacy was batting confidence, which reflected a subject's response on a 5-point Likert scale to the question "How confident are you in your batting?" (see Appendices A and B). Responses ranged from not at all (1) to very much (5).

Enjoyment of baseball. The late-season assessment of subjects' enjoyment of the baseball participation experience was a modification of the two items employed by Scanlan and Lewthwaite (1986) to measure enjoyment experienced by young wrestlers (see Appendix B). Subjects were asked to respond on a 5-point Likert scale to the following questions: "How much fun did you have playing baseball this season?" (where responses ranged from no fun at all [1] to very much fun [5]) and "How much do you like to play in this baseball league?" (where responses ranged from not at all [1] to very much [5]). As advocated by Scanlan and Lewthwaite, for each subject the unweighted sum of responses to these two items represented a measure of enjoyment of baseball.

Enjoyment of batting. The late-season assessment of enjoyment of batting was obtained in a similar manner as enjoyment of baseball (see Appendix B). In this case, however, subjects were asked to respond on a 5-point scale to these two questions: "How much fun did you have batting this season?" (where responses ranged

from no fun at all [1] to very much fun [5]) and "How much do you like to bat?" (where responses ranged from not at all [1] to very much [5]). For each subject, responses to the two items were summed to yield a measure of enjoyment of batting.

Satisfaction with batting performance. The late-season measure of subjects' satisfaction with their season's batting performance was based upon responses to the question "How pleased are you with the way you batted this season?" (See Appendix B). Subjects selected responses from very disappointed (1) to very pleased (4) on the 4-point Likert scale provided.

Persistence. To obtain an estimate of the extent subjects intended to persist in baseball, on the late-season test subjects were asked to respond on a 5-point Likert scale to the question "Do you think you will play in a baseball league again next year?" (see Appendix B). Subjects chose responses ranging from definitely will not play again (1) to definitely plan to play again (5). Additionally, an open-ended item followed in which subjects could express reasons for planning to play or not play next year.

Batting performance. At the conclusion of the treatment period, the batting performance of each

subject (in the two FB groups) was measured two ways. First, batting performance was assessed in the more traditional manner by computing batting average, which involved dividing a subject's number of base hits by number of official at bats. Second, batting performance was measured according to contact average, derived by dividing a player's number of times making fair contact by number of official bats.

Procedure

Experimental assistants. This study necessitated the hiring and training of eight assistants, six of whom were assigned to a (batting average FB or contact average FB) team to follow over the course of the season, and two of whom were designated to serve as alternates. These assistants, local high school students, were blind to the hypotheses of the study while performing their duties. At an introductory meeting with the experimenter, assistants completed an application and were verbally screened as to whether they possessed sufficient knowledge of baseball to accurately log individual players' number of at bats, base hits, and times making fair contact and to compute batting average and contact average. Additionally, assistants were told that they would each need a

calculator to facilitate the accurate and rapid computation of the statistics on batting performance.

Prior to the beginning of the actual study, the assistants met with the experimenter again for team assignments and instructions concerning the data logging and computational processes. Briefly stated, the experimenter explicitly defined and illustrated what was meant by "at bat," "base hit," "contact," "contact average," and "batting average"; presented the list of error criteria that would be used to determine whether or not to credit a subject with a base hit; gave instructions on how to administer questionnaires; and demonstrated how to use the tally sheets in data collection and fill out and distribute the FB cards. Additionally, assistants were instructed to maintain a qualitative log of subjects' behavioral responses to the administration of FB. During this meeting, each assistant received a notebook containing summaries of all instructions and error criteria (see Appendix C) as well as various supplies that would be needed (e.g., tally sheets, FB cards, pencils, and paper for the qualitative log).

Preintervention preparations and early-season assessments. Following approval from the university's human subjects review committee, the execution of the

present study was still predicated upon receiving consent from a series of parties. Approximately 6 weeks prior to the beginning of the baseball season, permission to conduct this study was sought from the commissioner of a community-sponsored youth baseball league. Once this permission was granted, the experimenter convened with the league's 16 coaches, explained the study, and asked for volunteers to allow players on their teams to serve as subjects. Nine coaches agreed to cooperate with the study, and these individuals were given parental consent forms (see Appendix D) to distribute to their players at their first practice sessions. Players took these consent forms home where they were to be signed by parents and/or guardians and then returned to the coaches who would give them back to the experimenter. In order to answer questions and describe the study in more detail, the experimenter held a meeting for parents 3 weeks before the season started.

After all necessary consents were obtained, 3 of the 9 teams were randomly assigned to each of the following conditions: contact average FB, batting average FB, and no FB. Coaches were notified regarding the condition to which their teams had been assigned.

In the session immediately following each participant team's second game of the season,

experimental assistants gathered subjects together, assured them of their confidentiality, and proceeded to administer background questionnaires as well as questionnaires to assess batting efficacy. The reason that these base line measures of batting efficacy were taken after two games of the season, as opposed to during the preseason, was to enable subjects to have some additional basis for judging their batting ability. The assistants explained to the subjects how each questionnaire was to be completed (see Appendix C). Subjects were told not to move on to the second questionnaire until all subjects had completed the first questionnaire, and so on. For each team, the administration of questionnaires by the assistant was supervised by either the experimenter or another graduate student.

Furthermore, at the same postgame session for teams assigned to either of the two FB conditions, the assistant read instructions regarding the interpretation of whichever type of batting performance FB that particular team would receive during the season (see Appendix C). Simply stated, teams in the contact average FB group were given a brief description of contact average, and those in the batting average FB group were given a description of batting average.

Intervention. During each game of the season (through the 10th game) for teams in the FB conditions, experimental assistants tabulated for their assigned team the number of official at bats, base hits, and times making fair contact for each subject and then calculated season totals in each of these categories. Prior to the start of each game, the assistants copied the batting order of the assigned team on to the rows of a game tally sheet (see Appendix C). When the assigned team was batting, for each subject who appeared at the plate in that inning assistants placed a "1" to indicate occurrence or a "0" to indicate nonoccurrence in subcolumns denoting at bats, contact, and hits (all within the appropriate inning column). In the event assistants had a question regarding the proper scoring of an event (e.g., should a subject be credited with an at bat, contact, and a base hit or just with an at bat and contact?) they were instructed to consult the instructions and/or error criteria contained in their notebooks. Additionally, to ensure that subjects would be appropriately credited on the tally sheet, assistants were instructed to be alert for any changes in the batting order. Throughout the season, the experimenter attended most of the games and thus was available to personally answer assistants' specific questions as well as to make certain that assistants were employing the

tally sheet in the proper fashion. After each game, assistants mailed a copy of the tally sheet to the experimenter.

After the team had batted for the final time in each game, the assistant calculated game and cumulative totals in each statistical category (at bats, base hits, and contact) for individual subjects. Next, the assistant computed updates of the relevant batting performance statistic for each subject. That is, assistants assigned to teams that received contact average FB computed contact averages, and those assigned to teams that received batting average FB computed batting averages. Assistants proceeded to transfer the performance information to the FB index cards (see Appendix C) and then seal them so that FB would be private.

Immediately following the team's next game, the assistant gave the FB cards to the coach who would distribute them to the subjects. For subjects in the contact average FB group, FB included cumulative at bats, contact, and contact average as well as corresponding information for the game prior to the one that had just been played. In the batting average FB group, subjects received FB that included at bats, base hits, and batting average for the season as well as for the game prior to the one that had just been played.

While the FB was being distributed, assistants recorded (in their notebooks) the behavioral responses of subjects. In accordance with the recommendations of the university's human subjects review committee, subjects were discouraged from sharing their FB information with each other. Please note that regarding the dissemination of FB, the original intention of the experimenter was for this to occur immediately before (rather than after) the next game so that FB would be as current as possible. However, the coaches objected to this as they believed that it would disrupt their pregame preparations.

This FB routine, which began following the 3rd game of the season, was repeated after every game through the 10th game for each team in the FB conditions with one exception. One of the teams in the batting average FB condition did not receive FB after the 10th game at the coach's request. This coach cited his team's continual discouragement by the FB as the reason for its discontinuation. Thus, instead of receiving FB a total of eight times during the intervention period as did the other teams in the FB conditions, this one team received FB seven times.

Throughout the intervention period, efforts were made to protect the rights of subjects as well as those players who chose not to participate in the study. In

addition to providing FB to subjects privately on sealed index cards and discouraging the sharing of FB information, another measure taken was that players who were not part of the study were given bogus FB cards containing either brief batting tips or motivational statements in lieu of performance information (see Appendix C). When sealed, these bogus cards looked exactly like the FB cards received by subjects. This was done in an attempt to ensure that nonsubjects would not feel excluded from their teammates while FB was being administered.

Late-season assessments and debriefing of subjects. Following the distribution of FB cards after the 10th game of the season for teams in the contact average and batting average FB groups (except for the one team which opted not to receive FB this last time) and immediately following the conclusion of the 10th game for teams in the no-FB group (and that one batting average FB team) experimental assistants administered to subjects inventories to assess batting efficacy, enjoyment of the baseball participation experience, enjoyment of batting, satisfaction with batting performance, and persistence (see Appendix B). The procedure for administering these questionnaires was similar to that employed with respect to the early-season questionnaires. Again, assistants

were supervised by the experimenter or another graduate student. Once the questionnaires were completed and collected, assistants distributed handouts which served to debrief subjects and their parents/guardians concerning the underlying nature of this batting performance FB study (see Appendix E). To the one batting average FB team that had discontinued its intervention one game prematurely, the experimenter made a brief comment about the fact that batting average is not necessarily the fairest gauge of one's performance and then offered to speak to subjects personally if they were still bothered by their earlier FB. No subjects accepted this invitation. The final task of the experimental assistants was to compute subjects' contact averages and batting averages through the 10th game of the season.

Treatment of the Data

Data for the first hypothesis, about changes in batting efficacy scores from early to late in the season were analyzed in a 3 x 2 (Group x Pre/Post) multivariate analysis of variance (MANOVA) with repeated measures on the second factor and with the two measures of batting efficacy, perceived batting competence and batting confidence, as the dependent measures. The data for the second hypothesis, concerning late-season enjoyment of

baseball, enjoyment of batting, satisfaction, and persistence, were analyzed in a one-way MANOVA for group. Data for the third hypothesis, regarding batting performance of the contact average FB and batting average FB groups, were analyzed in a one-way MANOVA for group on the two performance measures, contact average and batting average. The criterion level for all statistical tests was $p <= .05$.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The results of this study have been organized into three sections. The first section presents the results of self-report data. The second section presents results with respect to performance measures. The third section presents results of qualitative data obtained during the study.

Self-report results. Prior to testing any of the hypotheses, correlations among the self-report measures were examined for their degree of association. Table 2 presents a summary of the correlations which shows a moderate degree of association among the dependent measures. Additionally, in order to provide perspective on the data before delving into the inferential analyses, across-condition descriptive data are presented in this section. Subjects considered themselves slightly above average in perceived batting competence (on a scale when 4 denoted the highest perceived competence and 1, the lowest) in early season

Table 2

Correlations Among Self-report Measures.

Measure	1	2	3	4	5	6	7	8
1. Early-Season Perceived Batting Competence	-	.41	.60	.34	.26	.48	.35	.41
2. Early-Season Batting Confidence		-	.22	.48	.26	.43	.21	.10
3. Late-Season Perceived Batting Competence			-	.55	.19	.60	.67	.22
4. Late-Season Batting Confidence				-	.39	.67	.52	.24
5. Late-Season Enjoyment of Baseball					-	.49	.33	.41
6. Late-Season Enjoyment of Batting						-	.64	.42
7. Late-Season Satisfaction							-	.13
8. Late-Season Persistence								-

(M = 2.73; SD = .75) and in late season (M = 2.74; SD = .79). The batting confidence measure of batting efficacy (on a scale where 5 denoted the highest confidence and 1, the lowest) declined slightly from its fairly high early-season reading (M = 4.04; SD = .93) to its late-season assessment (M = 3.99; SD = .96). Late-season measures of enjoyment (on a scale where 10 indicated the most enjoyment and 2, the least) were very high for both the baseball experience in general (M = 9.33; SD = 1.17) and batting (M = 8.67; SD = 1.45). Regarding late-season satisfaction with batting performance (on a scale where 4 indicated the most satisfaction and 1, the least), subjects rated themselves as being quite satisfied (M = 3.21; SD = .89). Finally, the late-season assessment of persistence (on a scale where 5 denoted the highest level of persistence and 1, the lowest) indicated the subjects were extremely intent upon returning to a baseball league the following season (M = 4.68; SD = .71). As a whole, these data suggest that the overall youth baseball experience was a positive one for the subjects. The means and standard deviations for all self-report measures (across and within the three treatment groups) are listed in Table 3.

The first hypothesis stated that subjects receiving contact average FB would evidence a greater increase in

Table 3

Means and Standard Deviations for Self-Report Measures.

	Groups							
	Contact Average FB (n = 29)		Batting Average FB (n = 25)		No-FB (n = 24)		Total (N = 78)	
Dependent Measure	M	SD	M	SD	M	SD	M	SD
Perceived Batting Competence								
Early-season	2.62	(.81)	2.97	(.76)	2.61	(.63)	2.73	(.75)
Late-season	2.62	(.87)	2.76	(.87)	2.85	(.61)	2.74	(.79)
Batting Confidence								
Early-season	3.66	(1.05)	4.28	(.89)	4.25	(.68)	4.04	(.93)
Late-season	3.79	(.98)	4.12	(.97)	4.08	(.93)	3.99	(.96)
Enjoyment of Baseball	9.31	(1.07)	9.56	(.77)	9.13	(1.57)	9.33	(1.17)
Enjoyment of Batting	8.52	(1.53)	8.84	(1.18)	8.67	(1.63)	8.67	(1.45)
Satisfaction	2.97	(1.02)	3.32	(.75)	3.38	(.82)	3.21	(.89)
Persistence	4.83	(.54)	4.68	(.75)	4.50	(.83)	4.68	(.71)

batting efficacy from early season to late season compared to subjects receiving batting average FB and subjects receiving no FB. Therefore, batting efficacy scores were analyzed in a 3 x 2 (Group x Pre/Post) multivariate analysis of variance (MANOVA) with repeated measures on the second factor and with perceived batting competence and batting confidence as the dependent measures. Results from this analysis indicated no significant multivariate effects for group, F (4,148) = 1.62, p > .17, trials, F (2,74) = 2.26, p > .78, or Group x Trials, F (4,148) = 2.26, p > .065 (F statistics are an approximation based on Wilks' criterion). The Group x Trials interaction was close to reaching significance, but upon examination of means, the trends toward interaction were inconsistent between the dependent measures (see Figures 1 and 2). Therefore, the first hypothesis was not supported.

The second hypothesis predicted that subjects receiving contact average FB would show higher indicators of enjoyment of the baseball experience, enjoyment of batting, satisfaction with batting performance, and persistence late in the season compared to subjects receiving batting average FB and subjects receiving no FB. To test this hypothesis, a one-way MANOVA for group was conducted on these four late-season measures.

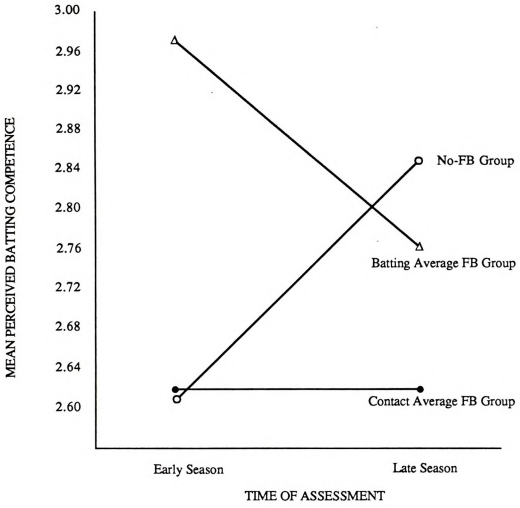

Figure 1. Changes in perceived batting competence as a function of early-season versus late-season assessment, by treatment group.

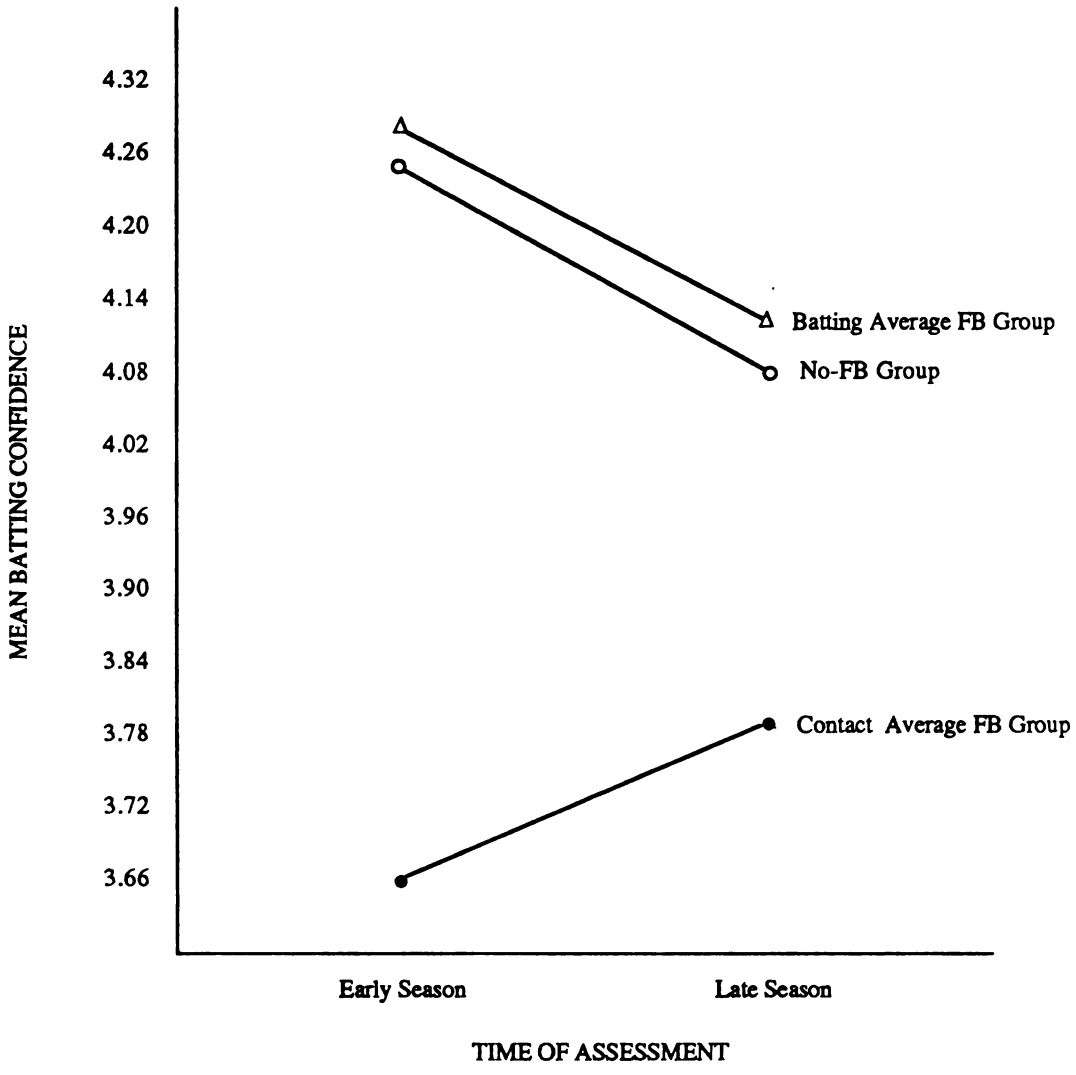

Figure 2. Changes in batting confidence as a function of early-season versus late-season assessment, by treatment group.

Results from this analysis revealed no significant multivariate effect for group, F (8,144) = 1.06, p > .40. Therefore, the second hypothesis was not supported.

Given the extreme differences among the groups on their early-season perceived batting competence scores, a one-way multivariate analysis of covariance (MANCOVA) was conducted on late-season measures of batting efficacy (both perceived batting competence and batting confidence), enjoyment of baseball, enjoyment of batting, satisfaction, and persistence using subjects' early-season perceived batting competence scores as the covariate. Results from this analysis indicated a significant overall multivariate effect for the covariate, F (6,69) = 9.40, p < .001. All post hoc univariate F tests were significant for all dependent variables with the exception of persistence. A summary of these univariate tests is contained in Table F-1 in Appendix F. No significant effect was found, however, for group, F (12,138) = .92, p > .53. These results suggest that regardless of treatment group, subjects' early-season batting efficacy (as measured by perceived batting competence) was responsible for late-season batting efficacy, enjoyment of baseball and batting, and satisfaction.

Performance measure results. Data on batting performance were collected only for the contact average

and batting average FB groups, not for the no-FB group. Across these two FB groups, late-season computations of contact average and batting average indicated that subjects made contact with the ball in more than half of their at bats (M = .537; SD = .24) and obtained base hits in nearly one-third of their at bats (M = .326; SD = .19). The ranges in batting and contact averages were .000 to .850 and .000 to 1.000 respectively. These data suggest that, overall, subjects in the two FB groups were fairly successful in batting. The means and standard deviations of all late-season performance measures (both across and within groups) are listed in Table 4.

The third hypothesis stated that subjects receiving contact average FB would show superior late-season (total) batting performance measures compared to subjects receiving batting average FB. To test this hypothesis, a one-way MANOVA for group was conducted on the two batting performance measures, batting average and contact average. Results indicated no significant multivariate effect for group, F (2,51) = .08, p > .93. Therefore, the third hypothesis was not supported.

Similarly to initial group differences in batting efficacy, groups showed extreme initial differences in contact averages as calculated over the first two games, prior to treatment (contact average FB group M = .457,

Table 4

Means and Standard Deviations for Late-season Performance Measures.

	Groups					
	Contact Average FB (n = 29)		Batting Average FB (n = 25)		Total (N = 52)	
Dependent Measure	M	SD	M	SD	M	SD
Contact Average	.528	(.24)	.548	(.26)	.537	(.24)
Batting Average	.316	(.17)	.337	(.22)	.326	(.19)

SD = .38; batting average FB group M= .527, SD = .35). Therefore, another one-way MANCOVA was conducted on batting and contact averages, using initial contact average as the covariate. Unfortunately, although results indicated a significant overall multivariate effect for the covariate, F (2,48) = 36.52, p < .001, no significant effect was found for group, F (2,48) = .27, p > .76. A summary of the post hoc univariate F tests is contained in Table F-2 in Appendix F. Similarly to batting efficacy, these results indicate that regardless of treatment group, subjects' early-season contact average was responsible for late-season contact average and batting average.

An additional comparison was made between the two FB groups in terms of the strength of the correlations between batting performance and efficacy. The rationale behind this comparison was that according to self-efficacy theory (Bandura, 1986), the less ambiguous the FB, the stronger the correspondence between self-efficacy and performance. Contact average FB would seem to provide less ambiguous information about batting than batting average FB because, as discussed in the Review of Literature, contact average FB provides the player with information strictly reflecting the frequency with which he or she strikes the ball, while batting average feedback reflects the outcome of many variables (e.g.,

the fielding ability of the opposing team and subjective judgments of the official scorer) that are not directly related to the player's own performance. The correlation between contact average and the perceived batting competence measure was .62 for the contact average FB group and .46 for the batting average FB group. The correlation between batting average and the perceived batting competence measure was .71 for the contact average FB group and .43 for the batting average FB group. Although a statistical comparison of the two groups showed no significant differences between the correlations, the relationship between batting efficacy and performance tended to be higher for the contact average FB group. All correlations were significantly different from zero.

Qualitative data results. Throughout the treatment period for the two FB conditions, each experimental assistant maintained a log in which he or she recorded subjects' behavioral responses when the FB index cards were distributed. Subjects in the contact average FB group and those in the batting average FB group displayed a number of similar positive and negative affective responses to the FB. For example, in both groups, subjects typically reacted to favorable FB with smiles and/or a desire to share the information with

teammates or parents. In response to or in anticipation of unfavorable FB, subjects in both FB conditions tended to curse, tear up the cards, throw them down, or ignore them (i.e., not even breaking the seal to look at the FB information) altogether. Noticeable differences between the two FB groups included reports that the batting average FB group (a) experienced incidents in which subjects cried in response to the FB while there were no such incidents documented in the contact average FB group, (b) evidenced a higher incidence of cursing responses compared to the contact average FB group, and (c) demonstrated more frequent questioning of the validity of the FB statistics and apparent confusion about the meaning of the FB compared to the contact average FB group. Also worthy of mention is that of the six coaches of teams in the FB conditions, the only one who actively sought to prematurely discontinue his team's treatment (i.e., the administration of FB) was a coach of a team in the batting average FB condition who cited his team's continual discouragement by the FB.

Discussion

The results of the study do not support the three hypotheses, that subjects receiving contact average FB would (a) show a greater increase in batting efficacy and (b) show higher indicators of enjoyment,

satisfaction, and persistence late in the season compared to subjects receiving batting average FB and subjects receiving no FB and (c) possess higher batting performance measures compared to subjects receiving batting average FB. Additional analyses revealed that regardless of treatment group, subjects' early-season batting efficacy (as measured by perceived batting competence) was responsible for late-season efficacy, enjoyment, and satisfaction; and early-season contact average was responsible for late-season contact and batting averages. There are several possible explanations for these findings. For the purpose of the present discussion, these explanations are organized according to whether they are methodological or conceptual in nature.

Methodological explanations. Subjects in the study were not provided with batting performance FB on a given game immediately following that game or even any time prior to the subsequent game. Rather, because of practical constraints and coaches' wishes not to have FB interfere with pregame preparations, FB on a given game had to be presented to subjects after the following game. In laboratory experiments, FB or KR administered on this type of schedule is called a trials-delay procedure. There exists considerable evidence from such

laboratory research that, compared to immediate FB conditions, trials-delay procedures are associated with performance decreases (Bilodeau, 1956; Lavery, 1964; Lavery & Suddon, 1962; Lorge & Thorndike, 1935). Salmoni et al. (1984) provided the following explanation for this phenomenon:

> Such clear effects on performance are predictable from a variety of viewpoints on how KR functions. They also fit with our position that KR is acting as guidance. When KR is delayed by a number of trials subjects are less able to use the KR in relation to the memory of the trial to which the KR has referred, and less effective planning of a next response is expected. Such effects could be caused by forgetting the earlier responses over time, by interference with its memory via the interpolated trials..., or by both. (p. 373)

Similarly, the delay of batting performance FB in the present study may have eliminated performance effects that might have been present had the FB been provided to subjects immediately after the game to which it referred. Furthermore, speculation is possible that this delay had a similar negative effect on the FB's ability to influence subjects' batting efficacy which,

in turn, diminished the FB's impact on enjoyment, satisfaction, and persistence. Future research in this area should attempt to provide immediate FB to subjects or, at least, minimize the delay period.

A second explanation for the failure of the results of the present study to support the hypotheses concerns the fact that FB was provided to subjects privately on index cards rather than through the typical means in which performance statistics of all team members are presented on a single-page handout. Provided in this private manner in order to ensure subjects' confidentiality and to satisfy recommendations of the university's human subjects review committee, as such the FB was diminished in terms of its natural social comparison component. According to Bandura (1981), social comparison of performance is a critical factor influencing one's self-efficacy. Additionally, evidence from developmental psychology suggests that the age group of subjects in the present study tends to use social comparison in making competence judgments (Ruble, Boggiano, Feldman, & Loebl, 1980). Therefore, by deemphasizing the social comparison aspect of the batting performance FB in the present study, some of the strength of the FB to modify batting efficacy and its hypothesized correlates may have been sacrificed. In order to better simulate FB that is normally given by

coaches to players, future research in this area should attempt to keep the social comparison component of FB intact.

A third methodological explanation for the failure to support the hypotheses about the effects of batting performance FB is related to the source of FB. In the study, FB statistics were compiled and recorded on index cards by experimental assistants rather than coaches. Even though coaches were the individuals who distributed FB cards to the subjects, subjects were no doubt aware that coaches neither tabulated the performance statistics themselves nor were allowed to see the FB information printed on the cards. In the field of industrial psychology, there exists evidence that the effects of FB are partially a function of the credibility (Geller, Eason, Phillips, & Pierson, 1980; Greller & Herold, 1975; Tuckman & Oliver, 1968) and power (Ilgen, Fisher, & Taylor, 1979; Prue & Fairbank, 1981) of the FB source. Duncan and Bruwelheide (1986) defined these two source dimensions as follows:

> Credibility refers to the knowledge of the source concerning the performance of the individual, and his or her familiarity with the task per se....Power refers to the extent to which the source influences or has control

> over rewards and punishers related to the worker's performance. (p. 103)

Applying this notion to the present study, subjects probably perceived the experimental assistant as the true source of batting performance FB, a source lacking in credibility and power compared to the coach. As such, the effects of the FB upon batting efficacy, enjoyment, satisfaction, and persistence may have been severely tempered. Future research should attempt to obtain greater cooperation from each coach so that he or she may serve as the actual source of FB as would be the case under typical circumstances.

A fourth methodological explanation for the failure to support the hypotheses is based on the premise by Reeve and Magill (1981) that in order for FB or KR to serve as an external standard influencing cognitions of the individual, that individual "must first develop an understanding of the information contained in the KR statement" (p. 84). In the present study, prior to treatment subjects in the FB conditions were read a brief description of the nature of the FB (batting average or contact average) that they would receive (see Appendix C). There is, however, a possibility that many subjects did not fully comprehend this description. In fact, qualitative data collected by experimental assistants indicated that some subjects reacted to the

FB with such responses as "Why did my average go down?" If such a lack of understanding were widespread, this would help illuminate why the FB did not have the effects on batting performance, batting efficacy, enjoyment, satisfaction, and persistence that were predicted. Any future research in the area of FB should attempt to ensure that subjects completely understand the essence of the FB with which they are to be provided. Additionally, such studies would benefit from including some type of questionnaire item as a check of subjects' FB comprehension.

Two additional methodological explanations that may account for the failure to support the hypotheses about the effects of batting performance FB are highly speculative but, nonetheless, merit inclusion in the present discussion. First, the treatment (i.e., administration of FB) period was rather short in duration, only eight games. Perhaps such FB requires a longer span of administration in order to noticeably impact batting performance, batting efficacy, and its hypothesized correlates of enjoyment, satisfaction, and persistence. Second, because of the nature of the league's schedule, usually subjects received FB only once per week. Over the course of a week's time, the effects of FB on batting efficacy may have lost potency. Therefore, over the entire season, the cumulative

effects of FB may not have been as robust as they might have been. This situation was exacerbated by the fact that due to extremely inclement weather, there were occasions in which subjects did not receive any FB for two or three weeks at a time. During such extended hiatuses, subjects and their coaches did not have any organized contact with each other. Based on these two speculative explanations, future field research in the realm of FB should attempt to study situations in which FB may be provided more frequently over a longer period.

Conceptual explanations. The finding that, regardless of treatment, early-season batting efficacy (as measured by perceived batting competence) was responsible for late-season batting efficacy, enjoyment, and satisfaction may be viewed as consistent with self-efficacy theory. Specifically, Bandura (1986) argued that "a strong belief in one's self-efficaciousness intensifies and sustains the effort needed to realize difficult performances which are hard to attain if one is doubt-ridden" (p. 394). From this premise, an inference may be drawn that initial self-efficacy is predictive of the type of cognitions and affect experienced during the execution of the task. In the present study, this would account for early-season

batting efficacy's strong influence on most late-season dependent measures across treatment conditions.

Related to this topic, it is interesting to note that an examination of the measures of batting efficacy revealed that in each of the three treatment conditions, at least one of the two efficacy measures (perceived batting competence and batting confidence) decreased or stayed the same throughout the season. In tandem with the finding of the strong influence of early-season batting efficacy on late-season batting efficacy, enjoyment, and satisfaction, these results have important implications for youth baseball coaches. Specifically, because of the power of early-season efficacy and the fragility of efficacy itself demonstrated in the present study, coaches should consider active strategies of enhancing the efficacy of their players at the beginning of and throughout the season. Such strategies for coaches include effective communication and positive verbal reinforcement, modeling, visualization, anxiety management through relaxation and/or reinterpretation of arousal, and placing an emphasis on effort over outcome (Lirgg & Feltz, 1989). Furthermore, because early-season efficacy seems to be such an important determinant of the quality of the sport experience, coaches should make an effort to structure preseason and early-season

practices in a manner that will ensure early successes for each child and thus maximize the initial efficacy which he or she takes into competition (Lirgg & Feltz, 1989). For example, before the season starts a youth baseball coach might schedule special practice sessions for some of the lesser-skilled batters in which he or she can give these individuals more private instruction and allow them the opportunity to practice batting off a tee and/or against slow pitching.

An additional conceptual explanation for the failure to support the hypotheses concerning the effects of different types of batting performance FB relates to goal setting, a variable that was uncontrolled in the present study. In an extensive review of literature on KR and performance, Locke et al. (1968) determined that the motivational effects of KR on performance are actually a consequence of the goals the individual sets in response to the KR. In particular, the more specific and difficult the goals set, the greater the effects on performance. This notion has received strong support in the literature on industrial psychology (e.g., Bassett, 1979; Ivancevich, 1974, 1977; Latham & Locke, 1975; Locke, 1968; Yukl & Latham, 1978) and partial support in limited research in sport psychology (Hall, Weinberg, & Jackson, 1987). Regarding the relationship among self-efficacy, FB, and goal setting, Bandura (1986) stated

that the activation of self-evaluation processes through internal comparisons requires both personal goals and FB of one's performance. Schunk (1983) supported this premise by finding that FB combined with specific, proximal goals facilitated heightened self-efficacy of children on a mathematical task. Thus, the present study's failure to control for the goals that subjects set in response to the batting performance FB that they received may have contributed to the lack of effect of FB on performance, batting efficacy, and (as a consequence) enjoyment, satisfaction, and persistence. Future research in this area should emphasize that subjects set and focus on personal goals throughout the treatment period. Additionally, a more specific recommendation is that research be undertaken to examine the possible interaction between various types of FB and education on goal setting.

Even though the statistical analyses did not support the hypotheses of the present study, qualitative data did support the study's basic premise that contact average is a more appropriate mode of FB for youth baseball players. Specifically, the underlying rationale for investigating the effects of contact average FB, an alternative to traditional batting average FB, was that contact average is less ambiguous and is based on a more realistic (for children)

definition of success: simply making contact with the ball as opposed to getting a base hit. Indeed, that contact average FB is more liberal than batting average FB in crediting a player with batting success might help to explain why subjects in the contact average FB condition did not exhibit crying in response to the FB, while some subjects in the batting average FB group did. Additionally, the finding that subjects in the batting average FB group were more apt to question the validity of their FB statistics or to express perplexity about them complements the correlational evidence discussed earlier in supporting the notion that batting average may be more ambiguous than contact average as a mode of FB. Youth baseball coaches who are determined to provide their players with batting performance FB are advised to take these qualitative findings into consideration in selecting the mode of FB to be used. In order to provide greater insight into how children interpret and emotionally respond to various types of performance FB, future investigators would benefit by interviewing subjects during and after the FB period.

Summary of recommendations for future research. Embedded within the previous discussion have been a series of suggestions for future research that are based on the experience and findings of the present study.

For the convenience of the reader, these suggestions are reiterated here:

1. Investigate FB that is presented on an immediate, rather than a trials-delay, schedule.

2. Investigate the effects of FB when the social comparison component of FB is left intact.

3. Secure greater cooperation from the coaches so that the effects of FB may be studied when each coach serves as the true source of FB for players on his or her team.

4. Examine the effects of FB when attempts are made to ensure that subjects understand the meaning of the FB that they receive. Additionally, provisions could be made for a questionnaire item to serve as a check of subjects' comprehension of FB.

5. Investigate FB that is presented frequently over a long time period.

6. Study the effects of FB when goal setting is controlled for or integrated into the research design.

7. Interviews should be included in an attempt to obtain a greater depth of insight into subjects' cognitive and affective responses to various types of performance FB.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The purpose of this study was to investigate the effects of different types of batting performance FB on the batting performance, batting efficacy, and other motivational factors of youth baseball players. Specifically, the hypotheses were that subjects receiving FB on their contact average would (a) exhibit a greater increase in batting efficacy from early season to late season compared to subjects receiving FB on their batting average and subjects receiving no FB, (b) show higher late-season indicators of enjoyment of the baseball experience, enjoyment of batting, satisfaction with batting performance, and persistence compared to subjects receiving FB on their batting average and subjects receiving no FB, and (c) evidence superior late-season (total) batting performance measures--contact average and batting average--compared to subjects receiving FB on their batting average.

The subjects were 78 children between the ages of 10 and 12 from 9 teams in a community-sponsored youth

baseball league in a small city in mid-Michigan. Of these subjects, approximately 95% were male, and 5% were female. Three teams were randomly assigned to each of the following conditions: contact average FB, batting average FB, and no-FB. Experimental assistants were assigned to each of the teams in the FB conditions to compute the relevant FB statistics throughout the treatment period.

Immediately following each game, from the 3rd to the 10th game of the season, subjects in the two FB conditions received their designated mode of FB privately on sealed index cards. Although FB statistics were tabulated and recorded on the cards by experimental assistants, coaches were the ones who actually distributed the cards to the subjects. FB for each subject was based on his or her performance in and through the game prior to the one that had just been played (e.g., immediately after the fifth game subjects received FB based on performance in and through the fourth game). The no-FB group served as the control group to which the contact average FB and batting average FB groups were compared.

Immediately following each team's second game of the season, subjects in all three conditions were administered questionnaires that, in addition to obtaining basic background information, assessed early-

season batting efficacy using two measures, perceived batting competence and batting confidence. Following the 10th game of the season, subjects were administered questionnaires designed to assess late-season batting efficacy (again using both measures), enjoyment of the baseball experience and batting, satisfaction with batting performance, and persistence. Throughout the eight-game intervention period for teams in the contact average FB and batting average FB groups, experimental assistants maintained a log of subjects' behavioral responses to receiving the FB cards. Batting performance measures (contact average and batting average) through the 10th game were computed for subjects in the two FB conditions.

Data for the first hypothesis, about changes in batting efficacy scores from early to late in the season, were analyzed in a 3 x 2 (Group x Pre/Post) multivariate analysis of variance (MANOVA) with repeated measures on the second factor and with perceived batting competence and batting confidence as the dependent measures. The data for the second hypothesis, about late-season enjoyment, satisfaction, and persistence, were analyzed in a one-way MANOVA for group. Data for the third hypothesis, regarding batting performance of the two FB groups, were analyzed in a one-way MANOVA for

group on the two performance measures, contact average and batting average.

The first hypothesis which dealt with changes in batting efficacy from early to late in the season indicated no significant differences across the three treatment groups and therefore was not supported. The second hypothesis predicted that the contact average FB group would show higher late-season enjoyment, satisfaction, and persistence compared to the batting average FB and no FB groups. Results of the analysis for this hypothesis were also not significant, indicating that this hypothesis was not supported. The third hypothesis predicted that the contact average FB group would possess higher late-season performance measures compared to the batting average FB group. Results indicated no significant differences of performance between these two groups, thereby failing to support the third hypothesis.

A supplementary analysis revealed that, regardless of treatment, early-season batting efficacy (as measured by perceived batting competence) was responsible for late-season efficacy, enjoyment, and satisfaction. Furthermore, regardless of treatment group, early-season contact average was responsible for late-season contact average and batting average. Finally, a qualitative analysis revealed that more negative behavioral

responses and confusion about the meaning of FB were associated with the batting average FB group than with the contact average FB group.

Conclusions

Based upon the findings and within the limitations of this study, the following conclusions were reached:

1. Neither contact average FB nor batting average FB affects the batting efficacy, enjoyment of baseball and batting, satisfaction with batting performance, and persistence of youth baseball players.

2. The effects on batting performance are no different for youth baseball players receiving contact average FB and those receiving batting average FB.

3. Regardless of the mode of FB, early-season batting efficacy is an important predictor of late-season batting efficacy, enjoyment of baseball and batting, and satisfaction with batting performance.

4. Contact average FB is associated with fewer and less frequent manifestations of negative affect and confusion than is batting average FB.

Implications for Coaching and Education

The finding that, regardless of FB, early-season batting efficacy determines players' later efficacy, enjoyment, and satisfaction has important implications

for youth baseball coaches. Specifically, coaches should employ efficacy enhancement strategies in preseason and early-season practices to ensure that players enter the competitive season with maximized initial efficacy. Among such strategies available to coaches are (a) clear communication of reasonable expectations, (b) positive verbal reinforcement, (c) modeling, (d) visualization, (e) anxiety management through relaxation and/or reinterpretation of arousal, and (f) emphasizing effort over outcome (Lirgg & Feltz, 1989). Additionally, coaches should attempt to ensure successes for each child before the season actually begins. For instance, this might entail the scheduling of special preseason practices for lesser-skilled batters in which the coach can give these individuals more private instruction and physical guidance and allow them the opportunity to bat off a batting tee and/or against the coach's easy pitching. Furthermore, the present study's finding that in each treatment group at least one of the two batting efficacy measures (perceived batting competence and batting confidence) decreased or stayed the same throughout the season suggests that batting efficacy can be fragile and, as such, the above enhancement strategies should not be abandoned as the season progresses.

Because the present study dealt exclusively with youth baseball players, caution is exercised in speculating that these implications may be generalized to other youth sports and to education in general. Nevertheless, a fairly reasonable generalization appears to be that structuring the educational or sport environment to facilitate early successes and provide for efficacy enhancement throughout the experience may be beneficial for young students and athletes.

Another important implication of the present study concerns the qualitative finding that, in immediate response to FB, subjects receiving batting average FB displayed more manifestations of negative affect and confusion about the meaning of FB than did their counterparts receiving contact average FB. Even though quantitative analyses did not support the three hypotheses regarding the effects of various forms of FB on normative measures of efficacy, enjoyment, satisfaction, persistence, and performance, these qualitative results suggest that--in accord with the premise underlying the hypotheses--contact average is a more appropriate mode of batting performance FB for youth baseball players because it is based on a more realistic definition of success and is less ambiguous compared to batting average. Youth baseball coaches who believe in providing players with performance FB are

urged to consider the affective benefits of contact average over batting average exhibited in the present study in selecting the mode of batting performance FB to be employed.

REFERENCES

REFERENCES

Adams, J. A. (1971). A closed-loop theory of motor learning. Journal of Motor Behavior, 3, 111-149.

Angell, R. (1972). The summer game. New York: The Viking Press.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Bandura, A. (1981). Self referent thought: A developmental analysis of self-efficacy. In H. J. Flavell & L. Ross (Eds.), Social cognitive development: Frontiers and possible futures. Cambridge: Cambridge University Press.

Bandura, A. (1986). Social Foundation of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice-Hall.

Barling, J., & Abel, M. (1983). Self-efficacy beliefs and tennis performance. Cognitive Therapy and Research, 7, 265-272.

Bassett, G. A. (1979). A study of the effects of task goal and schedule choice on work performance. Organizational Behavior and Human Performance, 24, 202-227.

Bilodeau, E. A. (1953). Speed of acquiring a simple motor response as a function of the systematic transformation of knowledge of results. American Journal of Psychology, 66, 409-420.

Bilodeau, E. A., & Bilodeau, I. M. (1961). Motor skills learning. Annual Review of Psychology, 12, 243-280.

Bilodeau, E. A., Bilodeau, I. M., & Schumsky, D. A. (1959). Some effects of introducing and withdrawing of results early and late in practice. Journal of Experimental Psychology, 58, 142-144.

Bilodeau, I. M. (1956). Accuracy of a simple positioning response with variation in the number of trials by which KR is delayed. American Journal of Psychology, 69, 434-437.

Brandmeyer, G. A., & Alexander, L. K. (1981). Some sociological clues to baseball as "national pasttime." In A. O. Dunleavy, A. W. Miracle, & C. R. Rees (Eds.), Studies in the sociology of sport (pp. 3-11). Fort Worth, TX: Texas Christian University Press.

Brustad, R., & Weiss, M. R. (1987). Competence perceptions and sources of worry in high, medium, and low competitive trait-anxious young athletes. Journal of Sport Psychology, 9, 97-105.

Burton, D., & Martens, R. (1986). Pinned by their own goals: An exploratory investigation into why kids drop out of wrestling. Journal of Sport Psychology, 8, 183-197.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. Psychological Bulletin, 56, 81-105.

Corbin, C. B., Laurie, D. R., Gruger, C., & Smiley, B. (1984). Vicarious success experience as a factor influencing self-confidence, attitudes and physical activity of adult women. Journal of Teaching in Physical Education, 4, 17-23.

Corbin, C. B., Stewart, M. J., & Blair, W. O. (1981). Self-confidence and motor performance of preadolescent boys and girls studied in different feedback situations. Journal of Sport Psychology, 3, 30-34.

Desharnais, R., Bouillon, J., & Godin, G. (1986). Self-efficacy and outcome expectations as determinants of exercise adherence. Psychological Reports, 59, 1155-1159.

Doumit, P. (1985). Hitting intrinsics, the mental side. Scholastic Coach, 54(6), 22-23, 66-67.

Duncan, P. K., & Bruwelheide, L. R. (1986). Feedback: Use and possible behavioral functions. Journal of Organizational Behavior Management, 7, 91-114.

Elwell, J. L., & Grindley, G. C. (1938). The effect of knowledge of results on learning and performance. British Journal of Psychology, 29, 39-53.

Feltz, D. L. (1982). Path analysis of the causal elements in Bandura's theory of self-efficacy and an anxiety-based model of avoidance behavior. Journal of Personality and Social Psychology, 42, 764-781.

Feltz, D. L. (1988). Self-confidence and sports performance. In K. B. Pandolf (Ed.), Exercise and sport sciences reviews (pp. 423-457). New York: Macmillan.

Feltz, D. L., & Brown, E. W. (1984). Perceived competence in soccer skills among young soccer players. Journal of Sport Psychology, 6, 385-394.

Feltz, D. L., Landers, D. M., & Raeder, U. (1979). Enhancing self-efficacy in high avoidance motor tasks: A comparison of modeling techniques. Journal of Sport Psychology, 1, 112-122.

Feltz, D. L., & Mugno, D. A. (1983). A replication of the path analysis of the causal elements of self-efficacy and the influence of autonomic perception. Journal of Sport Psychology, 5, 263-277.

Feltz, D. L., & Petlichkoff, L. (1983). Perceived competence among interscholastic sport participants and dropouts. Canadian Journal of Applied Sport Sciences, 8, 231-235.

Gayton, W. G., Matthews, G. R., & Burchstead, G. N. (1986). An investigation of the validity of the physical self-efficacy scale in predicting marathoning performance. Perceptual and Motor Skills, 63, 752-754.

Geller, E. S., Eason, S. L., Phillips, J. A., & Pierson, M. D. (1980). Interventions to improve sanitation during food preparation. Journal of Organizational Behavior and Management, 2, 229-240.

Gill, D. L. (1975). Knowledge of results and motor skill acquisition. Journal of Motor Behavior, 7, 191-198.

Goldstein, J. H. (1979). Sports, games, and play: Social and psychological viewpoints. Hillsdale, NJ: Lawrence Erlbaum Associates.

Gould, D., & Weiss, M. (1981). Effect of model similarity and model self-talk on self-efficacy in muscular endurance. Journal of Sport Psychology, 3, 17-29.

Greller, M., & Herold, P. (1975). Sources of feedback: A preliminary investigation. Organizational Behavior and Human Performance, 13, 244-256.

Hall, H. K., Weinberg, R. S., & Jackson, A. (1987). Effects of goal specificity, goal difficulty, and information feedback on endurance performance. Journal of Sport Psychology, 9, 43-54.

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. Human Development, 21, 34-64.

Harter, S. (1982). The Perceived Competence Scale for Children. Child Development, 53, 87-97.

Holding, D. H. (1965). The principles of training. Oxford: Pergamon Press.

Hunt, D. P. (1961). The effect of the precision of informational feedback on human tracking performance. Human Factors, 4, 77-85.

Ilgen, D. R., Fisher, C. D., & Taylor, M. S. (1979). Consequences of individual feedback on behavior in organizations. Journal of Applied Psychology, 64, 349-371.

Ivancevich, J. M. (1974). Changes in performance in a management by objectives program. Administrative Science Quarterly, 19, 563-574.

Ivancevich, J. M. (1977). Different goal setting treatments and their effects on performance and job satisfaction. Academy of Management Journal, 20, 406-419.

Jensen, B. E., Picado, M. E., & Morenz, C. (1981). Effects of precision of knowledge of results on performance of a gross motor coincidence-anticipation task. Journal of Motor Behavior, 13, 9-17.

Kavanagh, D., & Hausfeld, S. (1986). Physical performance and self-efficacy under happy and sad moods. Journal of Sport Psychology, 8, 112-123.

Latham, G. P., & Locke, E. A. (1975). Increasing productivity with decreasing time limits: A field replication of Parkinson's law. Journal of Applied Psychology, 60, 524-526.

Lau, C., & Glossbrenner, A. (1980). The art of hitting .300. New York: Hawthorn Books.

Lavery, J. J. (1964). The effect of one-trial delay in knowledge of results on the acquisition and retention of a tossing skill. American Journal of Psychology, 77, 437-443.

Lavery, J. J., & Suddon, F. H. (1962). Retention of simple motor skills as a function of the number of trials by which KR is delayed. Perceptual and Motor Skills, 15, 231-237.

Lenney, E., Browning, C., & Mitchell, L. (1980). What you don't know can hurt you: The effects of performance criteria ambiguity on sex differences in self-confidence. Journal of Personality, 48, 306-322.

Lirgg, C. D., & Feltz, D. L. (1989). Female self-confidence in sport: Myths, realities, and enhancement strategies. Journal of Physical Education, Recreation, and Dance, 60, 49-54.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. Organizational Behavior and Human Performance, 3, 157-189.

Locke, E. A., Cartledge, N., & Koeppel, J. (1968). Motivational effects of knowledge of results: A goal-setting phenomenon. Psychological Bulletin, 70, 474-485.

Lorge, I., & Thorndike, E. L. (1935). The influence of delay in the after effect of connection. Journal of Experimental Psychology, 18, 186-194.

MacPherson, S. J., Dees, V., & Grindley, G. C. (1948). The effect of knowledge of results on performance: II. Some characteristics of very simple skills. Quarterly Journal of Experimental Psychology, 1, 68-78.

Magill, R. A. (1985). Motor learning concepts and applications (2nd ed.). Dubuque, IA: Wm. C. Brown.

Magill, R. A., & Wood, C. (1983, June). Knowledge of results precision and movement organization in the acquisition of a complex pattern of discrete movements. Paper presented at the North American Society for the Psychology of Sport and Physical Activity, East Lansing, MI.

McAuley, E. (1985). Modeling and self-efficacy: A test of Bandura's model. Journal of Sport Psychology, 7, 283-295.

McAuley, E., & Gill, D. (1983). Reliability and validity of the physical self-efficacy scale in a competitive sport setting. Journal of Sport Psychology, 5, 410-418.

McGuigan, F. J. (1959). The effect of precision, delay, and schedule of knowledge of results on performance. Journal of Experimental Psychology, 58, 79-80.

Newell, K. M., & Carlton, L. G. (1980). Developmental trends in motor response recognition. Developmental Psychology, 16, 550-554.

Newell, K. M., & Kennedy, J. A. (1978). Knowledge of results and children's motor learning. Developmental Psychology, 14, 531-536.

Prue, D. M., & Fairbank, J. A. (1981). Performance feedback in organizational behavior management: a review. Journal of Organizational Behavior Management, 3, 1-16.

Reeve, T. G., & Magill, R. A. (1981). The role of components of knowledge of results information in error correction. Research Quarterly for Exercise and Sport, 52, 80-85.

Rogers, C. A. (1974). Feedback precision and postfeedback interval duration. Journal of Experimental Psychology, 102, 604-608.

Ruble, D. N., Boggiano, A. K., Feldman, N. S., & Loebl, J. H. (1980). Developmental analysis of the role of social comparison in self-evaluation. Developmental Psychology, 16, 105-115.

Sage, G. H. (1984). Motor learning and control (p. 323). Dubuque, IA: Wm. C. Brown.

Salmoni, A. W., Ross, D., Dill, S., & Zoeller, M. (1983). Knowledge of results and perceptual-motor learning. Human Movement Science, 2, 77-89.

Salmoni, A. W., Schmidt, R. A., & Walter, C. B. (1984). Knowledge of results and motor learning: A review and critical reappraisal. Psychological Bulletin, 95, 355-386.

Scanlan, T. K., & Lewthwaite, R. (1986). Social psychological aspects of competition for male youth sport participants: IV. Predictors of enjoyment. Journal of Sport Psychology, 8, 25-35.

Schmidt, R. A. (1975). A schema theory of discrete motor skill learning. Psychological Review, 82, 225-260.

Schunk, D. H. (1983). Developing children's self-efficacy and skills: The roles of social comparative information and goal setting. Contemporary Educational Psychology, 8, 76-86.

Shapiro, D. C. (1977). Knowledge of results and motor learning in preschool children. Research Quarterly of the American Association for Health, Physical Education, and Recreation, 48, 154-158.

Skinner, B. F. (1961). Cumulative record. London: Methuen.

Smith, R. E., Smoll, F. L., & Curtis, B. (1979). Coach effectiveness training: A cognitive-behavioral approach to enhancing relationship skills in youth sport coaches. Journal of Sport Psychology, 1, 59-75.

Smoll, F. L. (1972). Effects of precision of information feedback upon acquisition of a motor skill. Research Quarterly of the American Association for Health, Physical Education, and Recreation, 43, 489-493.

Stelmach, G. E. (1970). Learning and response consistency with augmented feedback. Ergonomics, 13, 421-425.

Stewart, M. J., & Corbin, C. B. (1988). Feedback dependence among low confidence preadolescent boys and girls. Research Quarterly for Exercise and Sport, 59, 160-164.

Thomas, J. R., Mitchell, B., & Solomon, M. A. (1979). Precision of KR and motor performance: Relationship to age. Research Quarterly of the American Association for Health, Physical Education, and Recreation, 50, 687-698.

Thorndike, E. L. (1927). The law of effect. American Journal of Psychology, 39, 212-222.

Trowbridge, M. H., & Cason, H. (1932). An experimental study of Thorndike's theory of learning. Journal of General Psychology, 7, 245-258.

Tuckman, B., & Oliver, W. (1968). Effectiveness of feedback to teachers as a function of source. Journal of Educational Psychology, 59, 279-301.

Ulrich, B. D. (1987). Perceptions of physical competence, motor competence, and participation in organized sport: Their interrelationships in young children. Research Quarterly for Exercise and Sport, 58, 57-67.

Weinberg, R. (1986). Relationship between self-efficacy and cognitive strategies in enhancing endurance performance. International Journal of Sport Psychology, 17, 280-293.

Weinberg, R., Gould, D., & Jackson, A. (1979). Expectations and performance: An empirical test of Bandura's self-efficacy theory. Journal of Sport Psychology, 1, 320-331.

Weinberg, R. S., Gould, D., Yukelson, D., & Jackson, A. (1981). The effect of preexisting and manipulated self-efficacy on a competitive muscular endurance task. Journal of Sport Psychology, 4, 345-354.

Weinberg, R. S., Sinardi, M., & Jackson, A. (1982). Effect of bar height and modeling on anxiety, self-confidence, and gymnastic performance. International Gymnast, 2, 11-13.

Wilkes, R. L., & Summers, J. J. (1984). Cognitions, mediating variables, and strength performance. Journal of Sport Psychology, 6, 351-359.

Williams, T., & Underwood, J. (1970). The science of hitting. New York: Simon & Schuster.

Woolfolk, R. L., Murphy, S. M., Gottesfeld, D., & Aitken, D. (1985). Effects of mental rehearsal of task motor activity and mental depiction of task outcome on motor skill performance. Journal of Sport Psychology, 7, 191-197.

Yan Lan, L., & Gill, D. L. (1984). The relationships among self-efficacy, stress responses, and a cognitive feedback manipulation. Journal of Sport Psychology, 6, 227-238.

Yukl, G. A., & Latham, G. P. (1978). Interrelationships among employee participation, individual differences, goal difficulty, goal acceptance, goal instrumentality, and performance. Personnel Psychology, 31, 305-323.

APPENDICES

APPENDIX A

Early-Season Questionnaires

BACKGROUND QUESTIONNAIRE

Name_____ Name of your Team_____

Address_____ Phone Number_____

Age_____ Grade_____

Birthdate: Month_____ Day_____ Year_____

Are you a BOY or a GIRL?_____

How many years (including this year) have you played in baseball (or softball or T-ball) leagues?_____

Were you at your team's first game of the season? (Circle one)
YES NO

Did you play in that game? (Circle one)
YES NO

STOP!!! PLEASE DO NOT TURN TO THE NEXT PAGE UNTIL YOU ARE TOLD.

BATTING QUESTIONNAIRE - PART A

INSTRUCTIONS: For each set of 2 sentences, choose the one that that you think describes **YOU** better. After doing this, make an **X** to show whether the statement you have picked is Really True for you or Sort of True for you. So, for each set of 2 sentences you should make only one **X** mark.

EXAMPLE:

Really True	Sort of True				Sort of True	Really True
		Some kids like to watch TV during their free time	BUT	Others would rather do different things		
_____	_____				_____	_____

==========

Really True	Sort of True				Sort of True	Really True
		(1) Some kids do very well at batting	BUT	Others don't feel that they are very good when it comes to batting		
_____	_____				_____	_____

---

		(2) Some kids wish they could be a lot better at batting	BUT	Other kids feel they are good enough		
_____	_____				_____	_____

---

		(3) Some kids feel that they are better than others their age at batting	BUT	Other kids don't feel they can bat as well		
_____	_____				_____	_____

BATTING QUESTIONNAIRE - PART B

INSTRUCTIONS: For the next question, circle the <u>one</u> answer that fits you best.

How confident are you in your batting? (Circle one of the answers below)

VERY MUCH	PRETTY MUCH	MODERATELY (a medium amount)	A LITTLE BIT	NOT AT ALL
5	4	3	2	1

SCORING KEY FOR BATTING QUESTIONNAIRE - PART A

Scoring Key: 4 = highest perceived batting competence
1 = lowest perceived batting competence

Item (1):	4	3	2	1
Item (2):	1	2	3	4
Item (3):	4	3	2	1

APPENDIX B

Late-Season Questionnaires

PLAYER IDENTIFICATION

Please print your NAME _____

NAME OF YOUR TEAM _____

STOP! PLEASE DO NOT GO TO THE NEXT PAGE UNTIL YOU ARE TOLD.

BATTING QUESTIONNAIRE - PART A

INSTRUCTIONS: For each set of 2 sentences, choose the one that that you think describes YOU better. After doing this, make an X to show whether the statement you have picked is Really True for you or Sort of True for you. So, for each set of 2 sentences you should make only one X mark.

EXAMPLE:

Really True	Sort of True				Sort of True	Really True
		Some kids like to watch TV during their free time	BUT	Others would rather do different things		
____	____				____	____

Really True	Sort of True				Sort of True	Really True
		(1) Some kids do very well at batting	BUT	Others don't feel that they are very good when it comes to batting		
____	____				____	____

---

		(2) Some kids wish they could be a lot better at batting	BUT	Other kids feel they are good enough		
____	____				____	____

---

		(3) Some kids feel that they are better than others their age at batting	BUT	Other kids don't feel they can bat as well		
____	____				____	____

BATTING QUESTIONNAIRE - PART B

INSTRUCTIONS: For each question, circle the <u>one</u> answer that fits you best.

1. How confident are you in your batting? (Circle one)

VERY MUCH	PRETTY MUCH	MODERATELY (a medium amount)	A LITTLE BIT	NOT AT ALL
5	4	3	2	1

---

2. How much fun did you have playing baseball this season? (Circle one)

VERY MUCH FUN	PRETTY MUCH FUN	SOMETIMES HAD FUN	A LITTLE BIT OF FUN	NO FUN AT ALL
5	4	3	2	1

---

3. How much do you like to play in this baseball league? (Circle one)

VERY MUCH	PRETTY MUCH	SOME	A LITTLE BIT	NOT AT ALL
5	4	3	2	1

***PLEASE TURN TO THE NEXT PAGE=======>

4. How much fun did you have batting this season? (Circle one)

VERY MUCH FUN	PRETTY MUCH FUN	SOMETIMES HAD FUN	A LITTLE BIT OF FUN	NO FUN AT ALL
5	4	3	2	1

---

5. How much do you like to bat? (Circle one)

VERY MUCH	PRETTY MUCH	SOME	A LITTLE BIT	NOT AT ALL
5	4	3	2	1

---

6. How pleased are you with the way you batted this season? (Circle one)

VERY PLEASED	SOMEWHAT PLEASED	SOMEWHAT DISAPPOINTED	VERY DISAPPOINTED
4	3	2	1

---

7. Do you think you will play in a baseball league again next year? (Circle one)

DEFINITELY PLAN TO PLAY AGAIN	PROBABLY WILL PLAY AGAIN	NOT SURE	PROBABLY WILL NOT PLAY AGAIN	DEFINITELY WILL NOT PLAY AGAIN
5	4	3	2	1

WHAT IS YOUR REASON?_____

_____

_____

_____

_____

SCORING KEY FOR BATTING QUESTIONNAIRE - PART A

Scoring Key: 4 = highest perceived batting competence
1 = lowest perceived batting competence

Item (1):	4	3	2	1
Item (2):	1	2	3	4
Item (3):	4	3	2	1

APPENDIX C

Instructions to Experimental Assistants

1. Definition of Performance Measures and their Determinants
2. Error Criteria
3. Instructions for Using Tally Sheets and Feedback Cards
4. Game Tally Sheet
5. Individual Player Tally Sheet: Contact Average Feedback Group
6. Individual Player Tally Sheet: Batting Average Feedback Group
7. Feedback Index Cards
8. Sample Bogus Feedback Card
9. Procedure for Administering Questionnaires and Explaining Feedback Type to Subjects

DEFINITION OF PERFORMANCE MEASURES AND THEIR DETERMINANTS

In order for you, the Research Assistant, to collect the data needed to provide batting performance feedback, five essential terms will be defined and illustrated here.

1. **At bat** - is logged any time a subject appears at the plate **except** in any of the following instances when he/she:
   (a) receives a base on balls (that is, a walk)
   (b) is hit by a pitched ball and is allowed to go to 1st base
   (c) executes a sacrifice bunt (that is, bunts a ball and is thrown out but advances other base runners)
   (d) hits a sacrifice fly (a fly ball that is caught by a fielder but a runner on third base tags up and scores a run on the play)
   (e) reaches 1st base when catcher's interference is called by the umpire

2. **Base hit** or **hit** - is credited to a batter who makes contact with the ball and reaches base **except** on those occasions when an ERROR charged to a player on the fielding team is responsible for the batter's reaching base. For example, a batter who reaches base by hitting a ground ball that goes through a fielder's legs is not awarded a hit. **TO DETERMINE WHETHER AN ERROR HAS OCCURRED, CONSULT THE 'ERROR CRITERIA' LIST.**

3. **Contact** - is credited to a batter who hits the ball in fair territory regardless of whether or not that batter reaches base safely. For example, a slow ground ball in the infield would be registered as contact just as would a home run hit beyond the outfield fence.

4. **Batting average*** - is a statistic computed by dividing a player's number of base hits by number of at bats. This statistic should be rounded off to the nearest one-thousandth (the third digit to the right of the decimal point). For example, if a player has 5 hits in 20 at bats, his/her batting average = 5/20 = .250. If a player has 9 hits in 27 at bats, his/her batting average = 9/27 = .333.

5. **Contact average*** - is a statistic computed by dividing a player's number of times making (fair ball) contact by number of at bats. This statistic should also be rounded off to the nearest one-thousandth (the third digit to the right of the

decimal point). For example, a player who has made contact 12 times in 25 at bats will have a contact average = 12/25 = .480.

---

* To facilitate the accurate and rapid computation of these batting performance statistics, **YOU WILL NEED A CALCULATOR.**

ERROR CRITERIA

The following are situations in which the batter should not be credited with a base hit even though the batter reaches base safely. You, the Research Assistant, should familiarize yourself with this list. Additionally, you should keep it handy for quick reference while working at each game. If you are ever unsure of whether a play fits the criteria, place a question mark in the HIT column, write a note to yourself about the situation, and consult me after the game by calling 355-4184.

1. Groundball hit directly at (or within 2 steps of) an infielder, and that infielder lets the ball goes through his/her legs.

2. Groundball hit directly at (or within 2 steps of) an infielder, and that infielder does not field the ball cleanly (unless you believe that the ball was hit so incredibly hard or the ball took such a bad hop that an infielder that age could not possibly be expected to make the play).

3. Line drive, pop up, or fly ball that lands in a defensive player's glove but then is dropped (unless [a] you believe that the ball was hit so hard or so high that a fielder that age could not possibly be expected to catch it or [b] the fielder had to run more than 8 ft. in any direction to get in position to field the ball).

4. Groundball which an infielder (including catcher) fields cleanly, and then the infielder makes a poor throw to the first baseman. In other words, the batter would have been thrown out at first base if an accurate throw had been made by the infielder.

   NOTE:The same scoring rule applies when the infielder makes a poor throw in an attempt to force out a lead runner at second base, third base, or home plate. [Example Situation: Runner on first base-->batter hits grounder to shortstop-->shortstop tries to force the runner (who was on first) by throwing to the second baseman covering second-->shortstop's throw to second base is not accurate, allowing the runner to reach second base safely.]

5. Groundball which an infielder fields cleanly, and the infielder makes an accurate throw to first base (in time to beat the runner), but the first baseman takes his/her foot off the base by accident.

   NOTE: The same scoring rule applies when a force out is attempted at any base and the fielder covering that base takes his/her foot off the base, allowing runners to advance (in spite of an accurate throw by the individual who had fielded the batted ball). [Example Situation: Runners on first base and second base-->batter hits grounder to shortstop-->shortstop tries to force the runner (who was on second base)

by throwing to the third baseman who is covering third base-->the shortstop's throw is accurate but the third baseman takes his/her foot off the base, allowing the runner to be safe.]

ANOTHER KEY POINT TO KEEP IN MIND WHEN SCORING:

* A force out of a lead runner (called a fielder's choice) is not credited to the batter as a base hit.

EXAMPLE#1: Runner on first base-->batter hits grounder to shortstop -->shortstop throws to second baseman who steps on second base to force out the runner (who was on first). Even though the batter reaches first base on this play, the batter is not credited with a base hit.

EXAMPLE#2: (This is a bit more tricky....) Runner on first base -->batter hits fly ball to the outfield-->outfielder does not catch the ball in the air, but fields the ball after it bounces and throws to second base before the runner (who was on first) gets there -->therefore, the runner who was on first base is forced out at second base. Even though the batter is allowed to reach first base on this play, the batter is not credited with a base hit.

BE ALERT FOR SITUATIONS THAT ARE SIMILAR TO THESE EXAMPLES!!!

INSTRUCTIONS FOR USING TALLY SHEETS AND FEEDBACK CARDS

Please read these instructions carefully as they will detail your tasks before, during, and after each game of the season for your assigned team.

During each game of the season, you will tabulate for each subject on your assigned team:

(a) his/her number of official AT BATS
(b) his/her number of BASE HITS
(c) his/her number of times making fair CONTACT

Prior to the start of each game, you will obtain the batting order from the team's manager or scorekeeper and carefully copy it in the "Player" column of the GAME TALLY SHEET (see attached). When your assigned team is batting during the game, you will place "1" marks in subcolumns denoting AT BATS, HITS, and CONTACT within the appropriate "Inning" column when such events occur for each subject. When the events do not occur, place "0" marks in the appropriate subcolumns.

Throughout each game, you should be alert for any player substitutions or any other changes in the batting order so that subjects will be correctly credited on the GAME TALLY SHEET. Ask the team's scorekeeper to keep you informed of such changes as they occur.

After your team has batted for the final time in each game, add up individual subjects' total in each category (AT BATS, HITS, CONTACT) in the appropriate right-hand "Totals" columns of the GAME TALLY SHEET*. Next, carefully transfer this information to each individual subject's own SEASON TALLY SHEET (see attached), and compute cumulative totals within each category. Additionally, you will use your calculator to compute for **both the most recent game and for the entire season** the batting performance statistic that your team has been designated to receive as feedback.

At this point, you are ready to fill out the feedback cards provided, making sure to write each player's NAME and TEAM, along with the DATE, on the backside of the index cards. For those team members not participating in the study, fill out NAME, TEAM, and DATE on the back of the BOGUS FEEDBACK CARDS designated for the appropriate game. For example, when the players in the study receive feedback based on performance through the second game, those players will receive set #1 of the bogus cards. Give all (including bogus) feedback cards to the team's coach so that he or she may distribute them to the correct individuals after the next game.

---

*One final point: After each game, you must mail a copy of the GAME TALLY SHEET to the experimenter in one of the stamped, addressed envelopes provided. Money to make copies will be given to you in advance by the experimenter.

GAME TALLY SHEET

Team _____ Opponent _____ Date _____
Research Assistant _____

Player /	Inning 1			2			3			4			5			6			7			Totals		
	AB	C	H	AB	C	H	AB	C	H	AB	C	H	AB	C	H	AB	C	H	AB	C	H	AB	C	H
1.																								
2.																								
3.																								
4.																								
5.																								
6.																								
7.																								
8.																								
9.																								
10.																								
11.																								
12.																								
13.																								
14.																								
15.																								

KEY: AB=at bat ; C=fair contact ; H=base hit

INDIVIDUAL PLAYER SEASON TALLY SHEET:
CONTACT AVERAGE FEEDBACK GROUP

Player's Name_____ **Team**_____

Game#	AT BATS	CONTACT	HITS	CONTACT AVERAGE (=C/AB)
Game#1				
Season Total				
Game#2				
Season Total				
Game#3				
Season Total				
Game#4				
Season Total				
Game#5				
Season Total				
Game#6				
Season Total				
Game#7				
Season Total				
Game#8				
Season Total				
Game#9				
Season Total				
Game#10				
Season Total				
Game#11				
Season Total				
Game#12				
Season Total				

Final Batting Average=(_____Hits)/(_____At Bats)=_____

INDIVIDUAL PLAYER SEASON TALLY SHEET:
BATTING AVERAGE FEEDBACK GROUP

Player's Name_____ Team_____

Game#	AT BATS	CONTACT	HITS	BATTING AVERAGE (=H/AB)
Game#1				
Season Total				
Game#2				
Season Total				
Game#3				
Season Total				
Game#4				
Season Total				
Game#5				
Season Total				
Game#6				
Season Total				
Game#7				
Season Total				
Game#8				
Season Total				
Game#9				
Season Total				
Game#10				
Season Total				
Game#11				
Season Total				
Game#12				
Season Total				

Final Contact Average=(_____Contact)/(_____At Bats)=_____

FEEDBACK INDEX CARDS

For subjects in the CONTACT AVERAGE FB group:

	AT BATS	CONTACT	CONTACT AVERAGE
LAST GAME	_____	_____	_____
SEASON TOTAL	_____	_____	_____

REMEMBER: The information printed here is just for you to see. You don't have to let anyone else see this card. Also, don't make others show their cards to you.

For subjects in the BATTING AVERAGE FB group:

	AT BATS	HITS	BATTING AVERAGE
LAST GAME	_____	_____	_____
SEASON TOTAL	_____	_____	_____

REMEMBER: The information printed here is just for you to see. You don't have to let anyone else see this card. Also, don't make others show their cards to you.

SAMPLE BOGUS FEEDBACK CARD

"I don't think you can emphasize enough the importance of practice. When I say practice, I mean with a bat... As a kid I was always swinging a bat..."
-Ted Williams (Science of Hitting)

REMEMBER: The information printed here is just for you to see. You don't have to let anyone else see this card. Also, don't make others show their cards to you.

For players (on teams in the feedback groups) who did not participate in the study, these cards were distributed in lieu of performance feedback. Following each game during the intervention period, these nonsubjects received index cards containing either motivational statements or batting tips (an example of which is depicted above).

PROCEDURE FOR ADMINISTERING QUESTIONNAIRES
AND EXPLAINING FEEDBACK TYPE TO SUBJECTS

Pretest Procedure - You will administer the packet of pretest questionnaires after the conclusion of your assigned team's **second game of the season**.... Read all instructions to subjects slowly. Here are the steps for you to follow:

1. Seat the subjects together on the bench or ground, free from distractions.

2. Tell the subjects: "I am going to hand out a packet of questionnaires. Please put your NAME on the first page. Even though your name will be written here, no one except the people involved in our study will know what your answers were. In other words, people like your coach, teammates, and people from the league will not be able to see how you answered the questions. So, please be HONEST with your answers."

3. Hand out the packet of questionnaires and pencils to subjects.

4. Tell the subjects: "Fill out the 1st page of questions. STOP when you get to the bottom of the page and look up at me. If you have any questions, please raise your hand. When all of you have completed this 1st page, we will all move on to the next one."

*5. When all subjects have completed the 1st page, tell them: "Now turn to the 2nd page. What we have here are some sentences, and what we are interested in is how you feel about some things. This is NOT a test. There are no right or wrong answers. Since kids are very different from one another, each of you will be putting down something different.....First let me explain how the questions work. There is one sample question at the top of the page which I'll read out loud. You follow along with me. Here it is....On the left it says '**Some kids like to watch TV during their free time BUT...**' and on the right it says '**Others would rather do different things.**'....So, this sentence is about two kinds of kids.....What I want you to decide **first** is whether you are more like the kids on the left side who would rather watch TV during their free time, or whether you are more like the kids on the right side who would rather do different things. Don't mark anything down yet, but first decide which kind of a kid is most like you, and go to that side.....Now, the second thing I want you to think about, now that you have decided which kind of a kid is most like you, is to decide whether that is only **SORT OF** true for you, or **REALLY**

true. If it's only **SORT OF** true, then put an **X** on the line under **SORT OF** true; if it's **REALLY** true for you, then put an **X** on the line under **REALLY** true.....For each sentence you only make an **X** on **one line.** Sometimes it will be on one side of the page, and other times it will be on the other side of the page, but you can only **X** one line for each sentence..... Do you have any questions? .....OK, that one was just for practice. Now we have some more sentences which I'm going to read out loud. For each one, just check one line, the one that goes with what is true for **you**, what **you** are most like. Listen closely. Here's the first real one. '**Some kids do very well at batting BUT...Others don't feel they are good when it comes to batting.**' Pick the side that fits you better. Now, put an **X** in the space under **REALLY** true or **SORT OF** true next to the one you picked depending on how well that sentence describes you.....Make sure you only make one **X**, even though there are 4 blank spaces that you can pick from. Raise your hand if you have any questions. Look up at me when you have made your **X**."

6. When everyone has completed the first item, tell the subjects: "Now we'll do the same type of thing with another sentence: '**Some kids wish they could be a lot better at batting BUT....Other kids feel they are good enough.**' Choose the side that describes you better and then make an **X** to show whether it is **REALLY** true or only **SORT OF** true for you. Raise your hand if you have any questions. Look up at me when you have made your **X**."

7. When everyone has completed the second item, tell the subjects: "One more of this type of question. Here is the sentence: '**Some kids feel that they are better than others their age at batting BUT...Other kids don't feel that they can bat as well.**' Choose the one that describes you better and make an **X** to show whether it is **REALLY** true or **SORT OF** true for you. If you have any questions, raise your hand. When you are done with this look up at me. Do <u>not</u> move on to the next page until I tell you."

8. When everyone has completed the third item, tell the subjects: "Turn to the next page. Here, there is one question: '**How confident are you in your batting?**' Answer this question by <u>circling</u> ONE of the answers listed below. If you don't understand something, please raise your hand. Look up when you have answered this question."

9. When everyone has finished--BEFORE COLLECTING THE PACKET--read the EXPLANATION OF WHICHEVER TYPE OF BATTING PERFORMANCE THESE SUBJECTS WILL RECEIVE....
(For teams in the NO FEEDBACK condition, skip to #10)

(a) Read to teams in the <u>**CONTACT AVERAGE FEEDBACK**</u>

GROUP:

"Before every game, throughout this baseball season, each of you will receive an index card that will contain information about how well you batted in the last game and how well you are batting in the season as a whole. The type of information you will receive is called your CONTACT AVERAGE. This will be a number which will represent how often you hit the ball in fair territory. The more times that you make contact with the ball and the ball goes in fair territory, the higher your CONTACT AVERAGE. It does not matter whether you are safe or out, as long as you hit a fair ball.... Does anybody have any questions?....There are three last points I would like to make:

(1) I would just like to remind you that this CONTACT AVERAGE statistic tells only about how well you have done at batting. Remember, even if your contact average is not as high as you would like it to be, you still might be doing great at another part of the game like fielding, base running or sportsmanship.

(2) The information printed on the index cards you will receive is just for **YOU** to see. You don't have to let anyone else see your card. Also, don't make others show you their cards.

(3) Finally, remember that while not everyone on the team is participating in the study, it is important that you do not ask each other about whether or not you are participating."

(Go to #10 on the next page for more instructions)

(b) Read to teams in the **BATTING AVERAGE FEEDBACK GROUP:**

"Before every game, throughout this baseball season, each of you will receive an index card that will contain information about how well you batted in the last game and how well you are batting in the season as a whole. The type of information you will receive is called your BATTING AVERAGE. This number will represent how often you get base hits. If you hit the ball but get out before you can reach base, your batting average does not improve. Also, if you get on base because of an error--like when the ball goes right through a fielder's legs--your batting average does not improve. The only way to improve batting average is by getting base hits.... Does anybody have any questions?....There are three last points I would like to make:

(1) I would just like to remind you that this BATTING AVERAGE statistic tells only about how well you have done at batting. Remember, even if your batting average is not as high as you would like it to be, you still might be doing great at another part of the game like fielding, base running or sportsmanship."

(2) The information printed on the index cards you will receive is just for **YOU** to see. You don't have to let anyone else see your card. Also, don't make others show you their cards.

(3) Finally, remember that while not everyone on the team

is participating in the study, it is important that you do not ask each other about whether or not you are participating."

10. Thank the players for their cooperation and collect the questionnaires.

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Posttest Procedure - You will administer the packet of posttest questionnaires after the conclusion of one of your assigned team's games toward the end of the regular season. You will be instructed by the Experimenter regarding the specific game.... Read all instructions to subjects slowly. Before beginning this procedure, make sure the coach distributes the final batch of feedback index cards to subjects. Here are the steps for you to follow:

1. Seat the subjects together on the bench or ground, free from distractions.

2. Tell the subjects: "I am going to hand out a packet of questionnaires. Please put your NAME on the first page. Even though your name will be written here, no one except the people involved in our study will know what your answers were. In other words, people like your coach, teammates, and people from the league will not be able to see how you answered the questions. So, please be HONEST with your answers."

3. Hand out the packet of questionnaires and pencils to subjects.

4. Tell the subjects: "Fill out your NAME and TEAM on the first page, and look up at me when you are done. Do not move on to the next page until I tell you."

*5. When all subjects have completed the 1st page, tell them: "Now turn to the 2nd page. What we have here are some sentences, and what we are interested in is how you feel about some things. This is NOT a test. There are no right or wrong answers. Since kids are very different from one another, each of you will be putting down something different.....First let me explain how the questions work. There is one sample question at the top of the page which I'll read out loud. You follow along with me. Here it is....On the left it says '**Some kids like to watch TV during their free time BUT...**' and on the right it says '**Others would rather do different things.**'....So, this sentence is about two kinds of kids.....What I want you to decide **first** is whether you are more like the kids on the left side who would rather watch TV during their free time, or whether you are more like the kids on the right side who would rather

do different things. Don't mark anything down yet, but first decide which kind of a kid is most like you, and go to that side.....Now, the second thing I want you to think about, now that you have decided which kind of a kid is most like you, is to decide whether that is only **SORT OF** true for you, or **REALLY** true. If it's only **SORT OF** true, then put an **X** on the line under **SORT OF** true; if it's **REALLY** true for you, then put an **X** on the line under **REALLY** true.....For each sentence you only make an **X** on **one line.** Sometimes it will be on one side of the page, and other times it will be on the other side of the page, but you can only **X** one line for each sentence..... Do you have any questions? .....OK, that one was just for practice. Now we have some more sentences which I'm going to read out loud. For each one, just check one line, the one that goes with what is true for **you,** what **you** are most like. Listen closely. Here's the first real one. '**Some kids do very well at batting BUT...Others don't feel they are good when it comes to batting.**' Pick the side that fits you better. Now, put an **X** in the space under **REALLY** true or **SORT OF** True next to the one you picked depending on how well that sentence describes you.....Make sure you only make one **X,** even though there are 4 blank spaces that you can pick from. Raise your hand if you have any questions. Look up at me when you have made your **X.**"

6. When everyone has completed the first item, tell the subjects: "Now we'll do the same type of thing with another sentence: '**Some kids wish they could be a lot better at batting BUT....Other kids feel they are good enough.**' Choose the side that describes you better and then make an **X** to show whether it is **REALLY** true or only **SORT OF** true for you. Raise your hand if you have any questions. Look up at me when you have made your **X.**"

7. When everyone has completed the second item, tell the subjects: "One more of this type of question. Here is the sentence: '**Some kids feel that they are better than others their age at batting BUT...Other kids don't feel that they can bat as well.**' Choose the one that describes you better and make an **X** to show whether it is **REALLY** true or **SORT OF** true for you. If you have any questions, raise your hand. when you are done with this look up at me. Do <u>not</u> move on to the next page until I tell you."

8. When everyone has completed the third item, tell the subjects: "Turn to the next page. In this section there are 7 questions. Read them and answer each separately by <u>circling</u> ONE of the answers. If you do not understand something, please raise your hand. Look up when you have answered all 7 questions.....As part of the 7th question, after you have circled your answer, there is some space for you to write in the reason why you **do or do not wish to participate in a baseball league**

next season."

12. Thank the players for their cooperation and collect the questionnaires.

13. Distribute Debriefing Handouts

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*Instructions adapted from Dr. Susan Harter's (1979) Perceived Competence Scale for Children, Manual: Form O.

APPENDIX D

Parental Consent Form

PARENTAL CONSENT FORM

Dear Parent or Guardian:

I am presently involved in the graduate program in Physical Education and Exercise Science at Michigan State University. I am interested in studying the effects of children getting feedback on their batting average in terms of their experience in youth baseball.

I would like to ask your child if he or she would be willing to participate in a study which will be conducted as a part of his or her involvement in the Youth Baseball League this spring. The only difference from ordinary participation in the league will be a brief set of questionnaires administered at the beginning and end of the season and the fact that prior to each game your child will receive an index card marked with one of two types of his or her current batting average. The questionnaires will assess self-confidence in batting, as well as enjoyment, satisfaction, and persistence in baseball. To protect your child's confidentiality, responses on the questionnaires and batting performance statistics will not be available to anyone except researchers involved in the study. Additionally, subjects will not be identified by name at any time in any reports of this research. If you decide to allow your child to participate you are completely free to withdraw consent and discontinue your child's participation at any time.

Enclosed is a parental consent form which provides a summary of your child's rights as a participant in the study. Please read the form carefully and keep in mind that your child will also be informed of his or her rights as a participant in the study. If you approve of this study's objectives, permitting your child to participate will help me in my efforts tremendously. Please sign this form, and have your child return it at his or her next baseball practice session.

If you would like further clarification of the study before granting your consent, you are invited to attend a PARENTS MEETING on Tuesday, April 18 at 7:00 P.M. at the Capitol Savings Community Room. In the event you have questions and are unable to attend the meeting, please feel free to contact me at 355-4184 or my advisor Dr. Deborah Feltz at 355-4732. Thank you very much.

Sincerely,

Anthony Bram

STUDY ON BATTING AVERAGE
CONSENT FORM
School of Health Education, Counseling Psychology
and Human Performance
Michigan State University

_____ of _____
(Child's Name) (Name of Child's Team)
has my permission, as legal parent or guardian, to participate in the Study on Batting Average conducted by Anthony Bram. I have received and understand the following information concerning the study:

1. The study has been explained to me. I understand the explanation that has been given and what my child's participation will involve.

2. I have discussed the study with my child, and he or she has agreed to participate. I understand that my child's participation is completely voluntary.

3. I understand that my child is free to discontinue his or her participation in the study at any time without penalty.

4. I understand that the results of the study will be treated in strict confidence and that my child will remain anonymous in all reports of the results. Within these restrictions, results of the study will be made available to me at my request.

5. I understand that, at my request, I can receive additional explanation of the study after my child's participation is completed.

_____
Parent or Guardian Signature

_____
Date

APPENDIX E

Debriefing Handout

Dear Baseball Player and Parent/Guardian:

I would like to take this opportunity to thank you for your cooperation in this research project. I hope that your participation was neither stressful nor inconvenient.

Now that all of the data has been collected, I am at liberty to discuss in more detail the purpose of this study. Essentially, I was trying to determine whether or not the type of batting statistic feedback given to youth baseball players has any effect on their overall batting performance, self-confidence with respect to batting, satisfaction with batting performance, enjoyment of the general baseball experience, enjoyment of batting, and desire to continue participation in baseball. Of the nine Youth Baseball teams involved in the study, three (Astros, Brewers, and Cardinals) received feedback on their contact average after each game, three (Tigers, Cubs, Indians) received feedback on their batting average after each game, and the other three teams (Mets, Braves, and Giants) did not receive any such feedback. What I will be looking for when I analyze the data in the coming weeks is differences across these three groups with respect to the motivational factors (self-confidence, enjoyment, etc.) mentioned above.

When the data has been thoroughly examined and the results become known, I will provide league officials with a summary which will be available to you upon request. If you have any further questions or comments regarding this study, please feel free to contact me at 355-4184 or my advisor Dr. Deborah Feltz at 355-4732.

Finally, any player on the feedback teams (Astros, Brewers, Cardinals, Tigers, Cubs, or Indians) who wishes to know his or her final contact average, may call me for that information at least one week after the final game of the season.

Thanks again for your cooperation.

Sincerely,

Anthony Bram

Anthony Bram

APPENDIX F

Univariate Analyses

Table F-1

Univariate F Statistics for Late-season Self-report Measures using Early-season Perceived Batting Competence as the Covariate.

Late-season Dependent Variable	df	F	p
Perceived Batting Competence	1,74	45.33	.001
Batting Confidence	1,74	9.39	.003
Enjoyment of Baseball	1,74	4.32	.041
Enjoyment of Batting	1,74	26.15	.001
Satisfaction	1,74	21.84	.001
Persistence	1,74	.73	.395

Table F-2

Univariate F Statistics for Late-season Performance Measures using Early-season Contact Average as the Covariate.

Late-season Dependent Variable	df	F	p
Contact Average	1,49	73.52	.001
Batting Average	1,49	50.76	.001

Appendix G

Raw Data

DATA DICTIONARY

Record #1

COL	VARIABLE	VARIABLE LABEL	VALUE LABEL
1-3	ID	-----	-----
4	TEAM	-----	1=Astros 2=Brewers 3=Cardinals 4=Tigers 5=Cubs 6=Indians 7=Mets 8=Braves 9=Giants
5	GROUP	-----	1=Contact average 2=Batting average 3=No feedback
6	GENDER	-----	1=Male 2=Female
7-8	AGE	-----	-----
9	GRADE	-----	-----
10			
11	PREPC1	1st Perceived Comp. Item	1=Really don't feel that good at batting 2=Sort of don't feel that good at batting 3=Sort of do very well at batting 4=Really do very well at batting

12	PREPC2	2nd Perceived Comp. Item	1=Really wish could be better at batting 2=Sort of wish could be better at batting 3=Sort of feel that good enough at batting 4=Really feel that good enough at batting
13	PREPC3	3rd Perceived Comp. Item	1=Really don't feel that can bat as well as others 2=Sort of don't feel that can bat as well as others 3=Sort of feel that can bat better than others 4=Really feel that can bat better than others
14	CONBAT1	Confident in batting (pretest)	1=Not at all 2=A little bit 3=Moderately 4=Pretty much 5=Very much
15			
16	POSTPC1	1st Perceived Comp. Item	1=Really don't feel that good at batting 2=Sort of don't feel that good at batting 3=Sort of do very well at batting 4=Really do very well at batting
17	POSTPC2	2nd Perceived Comp. Item	1=Really wish could be better at batting 2=Sort of wish could

			be better at batting 3=Sort of feel that good enough at batting 4=Really feel that good enough at batting
18	POSTPC3	3rd Perceived Comp. Item	1=Really don't feel that can bat as well as others 2=Sort of don't feel that can bat as well as others 3=Sort of feel that can bat better than others 4=Really feel that can bat better than others
19	CONBAT2	Confident in batting (posttest)	1=Not at all 2=A little bit 3=Moderately 4=Pretty much 5=Very much
20	FUNBASE	Extent had fun playing baseball	1=No Fun 2=A little bit of fun 3=Sometimes had fun 4=Pretty much fun 5=Very much fun
21	LIKBASE	Extent like playing baseball	1=Not at all 2=A little bit 3=Some 4=Pretty Much 5=Very Much
22	FUNBAT	Extent had fun batting	1=No fun at all 2=A little bit 3=Sometimes had fun 4=Pretty much fun 5=Very much fun

23	LIKBAT	Extent like batting	1=Not at all 2=A little bit 3=Some 4=Pretty much 5=Very much
24	SATIS	Satisfaction with batting performance	1=Very disappointed 2=Somewhat disappointed 3=Somewhat pleased 4=Very pleased
25	PERSIST	Extent planning to play in a baseball league next year	1=Defintely will not play again 2=Probably will not play again 3=Not sure 4=Probably will play again 5=Definitely will play again
26			
27-28	ATBAT	Total # of at bats	-----
29			
30-31	CONTACT	Total # of times making fair contact	-----
32			
33-34	HITS	Total # of hits	-----
35			
36-37	WHY	Reason for planning to play or not play again	-----
38			

39			
40	EARLYAB	# of at bats in 1st 2 games	-----
41	EARLYC	# of fair contact in 1st 2 games	-----
42	EARLYH	# of hits in 1st 2 games	-----

COMPUTED VARIABLES:

PRECOM = (PREPC1 + PREPC2 + PREPC3)/3

POSTCOM = (POSTPC1 + POSTPC2 + POSTPC3)/3

ENJBASE = (FUNBASE + LIKBASE)

ENJBAT = (FUNBAT + LIKBAT)

CONTAVE = (CONTACT/ATBAT)

BATAVE = (HITS/ATBAT)

EARLYCA = (EARLYC/EARLYAB)

EARLYBA = (EARLYH/EARLYAB)

001621104 2224 2224553335 11 02 01 300 1 1
002621126 4445 4333454434 27 19 07 542 2 2
003621115 4324 4435454545 24 10 06 431 2 3
004621126 3114 3124554524 23 17 06 220 2 1
005621114 1222 4345555445 13 05 02 300 1 1
007621126 4434 4434545545 27 22 12 541 1 1
008621115 4144 2123344342 16 03 01 300 1 1
009621103 2124 2122553535 13 04 02 200 1 1
010621104 4245 2122353525 12 03 02 211 1 1
012521126 4345 2235554533 23 21 15 431 1 1
013521126 4434 3433555545 23 14 12 532 1 1
014521127 4145 4225455545 29 21 14 654 2 2
015521104 3245 2124553425 15 02 01 310 2 1
016521126 4445 4334555435 22 08 04 310 1 1
017521125 2324 3325555535 29 20 16 644 1 2
018521126 4435 4345555545 21 20 15 221 2 1
019521126 3223 3124555445 20 13 07 542 2 2
020521115 3244 2134543535 23 13 10 432 2 2
021521126 2144 1123553425 23 11 06 422 2 2
025421126 4435 4435555544 31 27 17 431 1 1
026421104 3135 3235555435 22 05 02 300 1 1
027421115 4342 4445555545 20 20 17 222 3 2
028421114 4445 4445555545 20 08 04 300 1 1
029421104 3235 3145545535 23 13 08 422 1 2
030421103 4415 3444555445 28 16 09 210 1 1
033111126 4334 4244555535 21 16 09 543 2 2
034111126 1222 4333434545 28 16 08 321 2 2
035111103 4443 4344555445 11 04 03 200 1 1
036111115 4435 4445555545 26 21 12 542 1 1
037111104 2144 2132544435 18 09 06 200 1 1
038111116 3134 3444554435 21 15 11 444 2 2
039111104 3125 3215455535 23 13 07 521 1 1
040111105 4334 4445555545 26 18 14 531 1 1
041111126 4434 3444455545 09 06 04 000 1 1
044211104 3334 2223553434 13 02 00 200 1 3
045211115 3124 2114553515 15 05 02 210 2 1
046211115 3243 3435555545 27 24 14 541 1 1
047211114 4125 4325544545 20 13 10 433 2 2
048211126 4345 4335555545 25 19 16 531 1 1
049212115 1112 1112552213 11 06 01 310 1 1
050211104 3124 2124554525 16 07 05 433 2 2
051211115 3134 3133554535 13 08 05 531 1 1
052211126 2144 3135545445 19 15 07 211 2 2
055311115 3124 2233553525 07 03 01 200 1 1
056311115 1111 2122332325 11 02 02 200 1 1
057311105 2124 3124344415 14 01 01 300 1 1
058311104 4122 4113543435 06 00 00 000 2 2
059311115 3434 3134554525 16 08 06 410 1 1
060311127 4245 4234545545 26 19 12 333 2 2
06131211 3133 2133554525 14 05 03 200 1 1
062312126 3444 4435455443 17 15 09 332 2 2
063311115 3332 2123554435 16 07 04 221 2 2
064311126 3223 3123443325 20 08 04 300 1 1
065311115 3244 4244554535 24 12 05 300 1 1
069731104 2324 3323553335
070731126 3335 4335555545
071731115 3244 3233554535
072731104 2223 4313554444
073731115 3134 3224544535
074731114 3234 3234454444
075732115 2125 3135543434

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076731126 4124 2223444433
077731125 3234 3244344425
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080731127 1144 2323443325
082831114 3334 4444555545
083831127 4145 4135555535
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086831104 4445 3334555545
08783111  3335 4325554444
093931104 1123 2123544433
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095931114 3125 4445555545
096931105 3135 4135555545
098931103 4134 3234534544
099931105 3313 2332122212
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