ABSTRACT

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The following research explored how to define hustle in basketball as an individual trait, the uniqueness of hustle as a construct, and its predictability via a self-assessed scale. To do this the research employed a Delphi method with expert coaches to develop a definition and understanding of hustle. The trait of hustle was defined as “the consistent display of effort that is higher than a peer group's normal effort that occurs over an extended period of time beyond a single competitive event.” Regarding the uniqueness of hustle, the construct was not completely distinguishable from other constructs such as desire, determination, motivation, effort, and grit. It is possible that hustle could be an overarching term composed of subscales. To examine predictability, a scale to measure the trait of hustle consisting of 8-items with two factors (Personal Effort and Goal Effort) was created and administered this scale to 325 basketball players. Self-reported ratings were significantly related to peer-ratings of hustle but not composite hustle ratings used by the NBA. Results suggested that the developed scale should be re-examined or developed to properly measure subjectively rated hustle. Suggestions were made for uses of the hustle scale in the future for observation and manipulation of individual hustle.
Hustle: The Identification of Hustle in Individuals

by

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DEDICATION

To my advisor, Anne, who grew my mind.

To my mom, Lonnie, who grew my soul and drive.

To my dad, Michael, who grew my body and art.

To my family, who grew my curiosity.

To my love, Suzanne, who grew my heart.

To my coaches, mentors, teammates, and friends, who grew my hustle.
BIOGRAPHY

Landon Drew LaPorte began as a graduate student at North Carolina State University in August of 2010. He was born in Dallas, TX where he lived 12 years and then moved to Shrewsbury, MA. He attended Shrewsbury High School and participated in a variety of clubs and teams which he remains proud of to this day. After completing his undergraduate degree in Psychology at Wesleyan University, he moved to Arlington, VA where he worked in a variety of positions at IBM and Grant Thornton LLP. He currently lives in Raleigh, NC and works as a UX Researcher for MaxPoint, yet still calls Texas, Massachusetts, and Virginia home which makes things extremely confusing during the holidays.
ACKNOWLEDGMENTS

An acknowledgement page always falls short of its purpose in fully capturing all of the people and moments in a life that culminated in a final draft. It is unfair to name them all with the understanding that surely you miss a professor who offered guidance, a colleague who stayed for another drink, or a loved one who submitted encouragement.

A project on hustle is owed to the many influencers who have instilled this concept into my life. It was not born in me, but hustle was something that I learned from the great people in my life. It might have its roots in basketball camps run by Coach Jim Diamantopoulos or infamous double-sessions conducted under the watchful eye of Coach Terry Walles while I was coming up in the world of Shrewsbury, Massachusetts. It might have grown legs during conversations with coaches from the NC State Basketball team, Derrick Whittenburg, Jeff Dunlap, and Bobby Lutz. Yet, hustle did not just begin there. It was instilled in me by a mother who to this day exhibits a level of drive, determination, and effort incomparable in my history. She set a high bar whether she knew it or not and for that I thank her and must acknowledge her contributions into the completion of this long journey.
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## Conclusion

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- **Procedure**

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Chapter 1: Introduction

From William James (1907) to the current day, psychologists have explored the attributes of high-achieving individuals: intelligence (Gottfredson, 1997; Hartigan & Wigdor, 1989), perseverance (Ericsson & Charness, 1994; Howe, 1999), conscientiousness (Barrick & Mount, 1991), passion (Vallerand et al., 2003), tenacity (Gartner, Gatewood, & Shaver, 1991), and grit (Duckworth, Peterson, Matthews, & Kelly, 2007). Yet, one term used to describe effort and work has not been included in this list: hustle. Although hustle is commonly used and understood by the general population, particularly in athletics, it lacks uniform understanding. An established understanding of the term is essential as researchers seek to explore how hustle can be identified, how it relates to success, if it deserves distinction as a trait, and how it may be encouraged.

The term hustle can invoke both positive and negative connotations. Some individuals use the term hustle to describe the player who moves intensely on the field, while others remember the time a salesman hustled them out of their money on a purchase. Previous connotations of hustle do vary but this research strives to explore the trait of hustle that is viewed as the hard work and intense effort demonstrated by individuals in a positive and constructive way. Although this type of hustle can be holistically viewed as a desirable and important trait, individuals often struggle when specifying how hustle is manifested and displayed. It can vary by context or individual, which creates a sense of ambiguity in how we observe and encourage hustle. For these reasons, it is important to address questions in the domain of hustle:

1) What is a widely recognized definition of the trait of hustle?
2) Is hustle a unique construct?
3) How can hustle be measured? And;
4) How can hustle be predicted and observed?

**Literature Review**

**Selection**

The relevance of hustle in Psychology largely revolves around selection and its relationship to organizational and team success. Research has shown that by improving employee selection, organizations have realized improved levels of performance as measured by output, monetary value of output, and learning of job-related skills (Hunter, Schmidt, & Judiesch, 1990; Schmidt & Hunter, 1998). Selection has also shown importance in team composition and, in turn, effectiveness (Salas, Cooke, & Rosen, 2008). Although many areas benefit from better selection techniques, two sectors that have shown positive results from improved selection techniques include private industry and military (Ree, Earles, & Teachout, 1994; Schmidt & Hunter, 1998; Sumer, Sumer, Demirutku, & Cifci, 2001). Several studies referenced by Schmidt and Hunter (1998) have shown that personnel selection was improved by focusing on certain predictors of success, such as general cognitive ability, work sample tests, integrity tests, and conscientiousness.

Although these predictors have shown validity in predicting success, a large amount of variance remains unexplained according to Schmidt & Hunter (1998). Despite connections of conscientiousness to job performance (Mount & Barrick, 1995), no research has explored direct measures of effort and subsequently hustle to job performance. That
opportunity has inspired the following research in hustle and its attempt to develop a measure of trait effort and improve selection.

**Hustle in Basketball**

Sport offers a variety of settings in which to observe psychological frameworks and theories (Tartakovsky, 2011). Hustle has recently gained fame as an observable metric in athletics, particularly in professional basketball (Reynolds, 2015). As the use of data analytics has grown in professional sports, the National Basketball Association (NBA) and its various teams and members have sought ways to leverage data to improve their product. During the summer of 2015, the statistic trackers of the NBA classified various athletic actions such as steals, blocks, shots contested, deflections, loose-ball recoveries, screen assists, and charges taken as hustle metrics (Concepcion, 2015). Although these actions have long been a part of the sport, some have not been formally tracked. The NBA determined that to observe hustle these metrics were to be tracked for an entire summer league season to determine relationships to success and understand performance of their players. Initial findings from Vandeusen (2015) suggested positive relationships between hustle metrics and game outcome, shown by teams with more discrete hustle actions winning a higher percentage of their games. While the metrics have taken an initial attempt at explaining hustle they did lack in exploring how and if hustle was an individual trait that varied from person to person.

**Previous Construct Overview**

Within this research, it was first considered that hustle might already exist under the name of an existing construct. Such constructs included effort, perseverance, tenacity,
passion, or grit. These constructs shared common characteristics of goal commitment, persistence, goal-orientation, and the manifestation of effort and work in their definition. However, a face-value understanding of hustle as a trait separated it from each of these terms in that hustle describes a long-term display of high individual effort as compared to normal effort. While each construct might have addressed a component of hustle, none of the aforementioned constructs fully encapsulated the display of high effort as compared to normal effort.

**Effort.** Although definitions and uses vary, effort was noted as a construct that describes the output of an individual or team in response to a task (Williams & Seiler, 1973). Previous research focused on how effort was affected by task difficulty and depended on specific situations (Spink, Wilson, Brawley, & Odnokon, 2013; Sun, Yao, & Carretero, 2014; Willis, Farrer, & Bigler, 2011; Wood & Bitterman, 1950). In these cases, effort was seen as variable and affected by the environment. Research does not fully explore if levels of effort were a trait of the individual or a product of the task. This research also failed in delineating which individuals are likely to display more effort than others.

It is logical why effort could be considered similar to hustle as both entail the output of energy or the demonstration of work in a task. However, effort suffered from a similar criticism carried by hustle: a lack of universal understanding. Effort was a term often used to describe “how hard a person works” (Williams & Seiler, 1973, p. 49). However, multiple researchers have noted how effort was “without any clear specification” and consequently had “no operationalization … that possesses even a modicum of construct validity” (Campbell & Pritchard, 1976 as quoted by Brown & Leigh, 1996, p. 361). Researchers have
offered varied explanations of effort by describing it as a measure of attention and capacity (Kahneman, 1973) or as a measure of work motivation that can be observed and tracked (Landy & Guion, 1970).

Kahneman’s 1973 research on attention and effort proposed a model of effort expression that provided insight into how effort might relate to hustle (Figure 1). In the figure adapted from Kahneman’s attentional model, effort supplied was related to effort demanded by a primary task. As the demands of effort increased, the effort supplied could have also increased until maximum effort was achieved. The model also noted a potential gap that existed between effort supplied by an individual and the total maximum effort (referred to as “spare effort”). It is in the space of spare effort where Kahneman’s model provided insight into the concept of hustle. In Kahneman’s (1973) attentional model, spare attentional capacity, or spare effort, was described as the difference between total attentional capacity of an individual and the attentional capacity currently supplied to high priority tasks in a dual-task trial.
By researching individual disparities in the spare effort gap it was possible to understand the individual differences that related to higher effort. It was theorized that individuals with smaller spare effort gaps exhibited higher ratings of hustle. The model also provided a basis for understanding how individuals might vary in their slope or intercept, providing a starting point for understanding individual differences in effort supplied.

**Perseverance.** Perseverance was seen as possibly synonymous or related to the trait of hustle. Previous research described perseverance as a personality trait often manifested in work or time spent achieving a final goal or solution (Clark, 1935; Leonard & Weitz, 1971; Williams & DeSteno, 2008). Londoner (1972) noted that an individual who had the trait of perseverance was one who consistently worked towards a goal despite obstacles. In
Londoner’s educational research, a perserverer was an individual that obtained their long-term goal of a degree or completed the program in which they enrolled.

Research suggested that perseverance relied on elements of resilience, diligence, and persistence in the attainment of a goal (Robertson-Kraft & Duckworth, 2014). Previously mentioned studies shared a commonality in that their uses of perseverance hinged on achieving a long-term goal in the face of obstacles; however, all of these studies lacked exploration in the level of energy and effort required for those goals as compared to others. While an individual might have displayed high levels of perseverance in attaining a goal over a long-period of time, their levels of perseverance did not detail their effort exerted or their hustle in working towards a goal. It is possible that perseverance might be a component of hustle; however, perseverance as a term was ill-suited to describe the hypothesized component of the displayed effort associated with hustle.

**Tenacity.** Tenacity was another term frequently associated with the concept of hustle. In the physical realm, particularly in the field of chemistry, tenacity was used to describe the staying power or persistence of an object or bond. This definition was often extrapolated to describe individuals that persist and adhere to a goal. Tenacity has been examined in the domain of entrepreneurial research to determine characteristics of successful entrepreneurs (Baum & Locke, 2004; Timmons, 2000). In a research study that examined characteristics related to entrepreneurial success, Baum and Locke (2004) defined tenacity as “a trait that involves sustaining goal-directed action and energy even when faced with obstacles” (p. 588), indicating a close similarity to findings related to perseverance.
Research on tenacity conducted by Ausubel and Shiff (1955) included elements of individual satisfaction, high levels of individual aspiration, and the avoidance of failure.

Brandtstadter and Rothermund (2002) examined how tenacious individuals overcame obstacles in their examination of the dual-process model of goal pursuit. In this model individuals resolved conflicts in two ways: assimilation or accommodation. Individuals who pursued goals with an assimilative approach sought to alter environments and situations to obtain a closer fit with personal goals and desires. These assimilative individuals were found to exhibit more tenacious goal pursuit compared to others as they bent and molded environments and obstacles to suit their needs. The assimilative technique of goal pursuit was balanced in the dual-process model of goal pursuit by the accommodative approach, where individuals pursued goals flexibly and disengaged from goals when necessary.

Similar to perseverance, tenacity required elements of determination and goal-commitment (Baum & Locke, 2004; Timmons, 2000). While both tenacity and perseverance described elements of work and continued effort in the face of obstacles, they did not describe the physical display of effort in a task. This ultimately highlighted the need for further understanding of the hustle construct.

Passion. Another construct proposed to have some overlap and connection with hustle was passion. In a study on passion and performance, Vallerand, Mageau, Elliot, Dumais, Demers, and Rousseau (2008) described passion as a “strong inclination toward an activity that individuals like (or love), that they find important, and in which they invest time and energy” (p. 374). This inclination was said to spur individuals in their pursuits and goals by providing a source of motivational energy for accomplishment. This followed with
findings in entrepreneurship where Baum and Locke (2004) noted that passion for work, or love of one’s work, was seen as a “core characteristic” of great wealth creators in society and a component of success (p. 588). Cardon (2008) extended this explanation by describing passion’s two key elements: 1) positive and intense long-term feelings for a goal, and 2) a deep connection to work that encompasses identification of an individual in a role. In this previous research, passion was measured in terms of emotions of love, attachment, longing, hours of work, and a tendency to perceive successes and failures as personal events. Passion was also related to emotional energy, drive, and spirit for entrepreneurs and was identified as an important trait for success in business (Bird, 1989).

Although described as an element of motivation and praised as a component of success, passion lacked in its ability to describe effort and subsequently hustle. While it might be presumed that passionate individuals demonstrated higher or continued effort than non-passionate individuals, research that examined passion and its relationship to effort was not available. For these reasons, research on passion showed an inability to explain the proposed construct of hustle and its associated elements of effort.

Grit. Grit was a more recently developed construct associated with goal commitment and success. It has been defined as a passion and perseverance for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Research on grit detailed how gritty individuals are diligent, consistent, persistent, and committed to long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007; Robertson-Kraft & Duckworth, 2014). Grittier individuals achieved higher levels of education than individuals of the same age, earned higher grade point averages (GPA), were more likely to stay in college, and performed better
on national spelling assessments (Duckworth, Peterson, Matthews, & Kelly, 2007). Grit’s relationship to effort has also been examined by observing how grittier individuals tend to exhibit more intensity during exercise (Reed, Pitschet, & Cutton, 2013).

The breadth of these studies detailed how grit can be pivotal to performance and goal-attainment in the long-term, yet the extent of grit research did not fully describe levels of displayed effort as compared to available effort. Research into grit has provided benefits in understanding perseverance and the follow-through of individuals in their pursuit of a goal. It has been posited that gritty individuals do work harder and longer than their peers (Duckworth, Peterson, Matthews, & Kelly, 2007). While it was plausible that hustle and grit could be highly related as individuals who exhibited more effort are also more persistent in their goal attainment, grit should not be thought of as synonymous with hustle because it did not address elements of displayed physical effort.

**Hustle and its Relationship to Performance**

Common presumption implied that hustle was the manifestation of effort in a physical task. It has been found that increased effort intensity was positively related to performance and outcome achievement (Brown & Leigh, 1996). Koelega, Brinkman, Hendriks, and Verbaten (1989) supported these findings with their determination that better performers expended more effort in tasks. Professional basketball has followed this line of thinking by noting how teams who completed more hustle actions were more likely to win basketball games (Rain, 2016). However, what has not been explored was how individuals with high levels of trait hustle could be identified beyond performance. Hustle metrics have not long
been in use in professional basketball, yet their recent adoption offered support to identifying hustle as a key and important trait within individuals.

**Self-Presentation and Illusory Superiority**

When conducting studies that require self-report from participants it was seen as essential to understand the tendency for individuals to rate themselves as better than average (Guenther & Alicke, 2010). The validity of experiments has often victimized by a phenomenon that some refer to as self-presentation or social desirability bias (Baumeister & Hutton, 1987; Marlowe & Crowne, 1961). Individuals adjust their behavior or responses to convey more positive information about themselves to other people. Since hustle is often encouraged and viewed as a positive trait, individuals within the domain of basketball might be biased in their self-report of their own hustle.

**Summary**

While hustle might be seen as similar to previously established constructs such as effort, perseverance, tenacity, passion, and grit, the proposed construct of the trait hustle showed fundamental differences from these constructs. Unlike previous constructs that focused on effort and goal attainment, trait hustle was theorized to focus on displayed physical effort at an individual level. Through the use of Kahneman’s (1973) model of attentional effort as a template, it was proposed that the observable gap between total effort supplied and total available effort could be explained by the trait of hustle and that this gap could vary between persons. This gap, referred to in the model as spare effort, has lacked exploration by previous research and offered a lens for researchers to observe individual differences in hustle.
Aims

Although the concept of hustle was widely used and advocated for in both athletic and non-athletic domains, a global understanding of the trait of long-term hustle and an approach to predict hustle had been lacking. The following research established a definition of the trait of hustle, created a self-report questionnaire to identify individuals with higher hustle, and examined the predictability of hustle using the created scale. The following research sought to address the following aims:

1. To define trait hustle, a definition was established by an expert panel of coaches;
2. To determine the uniqueness of trait hustle as a construct, an expert panel rated the similarity of hustle to existing constructs;
3. To predict trait hustle, a hustle scale was developed and hustle ratings were compared to peer-reported hustle and performance.
Chapter 2: Research Methodology

Methodology Overview

In the establishing of a construct to explain behavior one must first describe, then measure, then predict, and ultimately demonstrate control over the behavior. This research followed that model by first defining the trait of hustle, then developing a tool for its identification, and ultimately predicting the level of the trait hustle in individuals (Figure 2).

To establish an accepted definition of the trait of hustle, experts in the field of athletics (experienced basketball coaches), were surveyed through the Delphi method of analysis to determine an agreed upon definition of hustle. During this process, experts were solicited to provide input on elements of the trait of hustle and validate potential connections of hustle and other established traits. A scale was then created in a second study from expert panel results to measure hustle. This scale was then administered to a sample of athletes to determine individual differences in hustle as well as hustle’s relationship to other variables.

*Figure 2 - Research Methodology Overview*
After creating a scale that could measure the presence and level of hustle in individuals, the research team then validated the scale. Athlete self-reported hustle was compared to hustle assessed by athletic peers to determine the reliability of the scale. All materials and processes were approved by an Institutional Review Board.

While the manipulation of hustle was not explored in the current research, the completed research provided initial guidance on techniques to influence the display of hustle. Future hustle manipulation techniques should be informed by previous approaches in manipulating mindset, effort, and motivation.
Chapter 3: Preliminary Study

Introduction

A preliminary survey was conducted to explore the uniqueness of the proposed hustle construct and its identification. This survey was generated to provide exploratory results and guidance on the common understanding of the proposed construct of hustle. Operating with the assumption that individual hustle could be identified by experts in the domain and that the construct of hustle was generally understood, it was theorized that individuals with adequate knowledge of basketball would reach consensus in identifying NBA players regarded as hustle players. The survey also proposed exploratory questions to examine if commonly tracked basketball metrics were representative of hustle (Concepcion, 2015; Reynolds, 2015; Vandeusen, 2015). To determine the uniqueness of hustle as a trait, hustle was also compared to other pre-existing constructs with proposed similarities to hustle such as motivation, grit, growth mindset, internal locus of control, and self-efficacy.

Method

Participants

The preliminary study recruited current and former basketball coaches for the completion of a questionnaire. Sixty-one participants completed the preliminary survey (Males = 42, Females = 10, Unidentified = 9) with an average of 2.45 years of coaching experience ($SD = 1.52$). Participants reported their highest athletic level at which they had served as a coach (Non-school affiliated = 15, High School = 14, College = 9, Professional = 1, and Other = 12). Participants were solicited through personal communications and were not compensated for their time.
Materials

A survey was created for the assessment of hustle that consisted of five sections (Appendix A). Participants reported demographic information such as gender, coaching experience, interest in professional basketball, area of residence, and favorite professional NBA team. In further sections, participants were asked to identify NBA basketball players from the 2013-2014 season that demonstrated the trait of hustle by selecting 3 players out of groups of 10. Participants were then asked to rank which commonly tracked basketball metrics were representative of hustle from a list provided. Participants sorted the metrics in the survey and metrics ranked with a lower number were considered more representative of hustle (i.e. a ranking of “1” was considered the most representative metric of hustle). After ranking metrics, participants were asked to rate the importance of an existing construct to hustle on a 5-point Likert scale (1 = “Very Unimportant” to 5 = “Very Important”). Participants then reported other items or components of hustle if they were not previously listed in an open-text field.

Procedure

Participants who had previous coaching experience with the lead researcher were sent an email with a link to the survey by the lead researcher (approximately 150 individuals). Participants gave consent and then completed the survey. At the conclusion of the survey they were informed to contact the lead researcher with any further questions.
Results

Identifying Hustlers

Figure 3 - NBA Players rated as high hustle players (by frequency) illustrated the top 10 professional athletes identified as high hustlers and the frequency with which they were identified. Figure 4 represented the bottom 10 individuals that were identified as low hustle NBA athletes. Only two athletes out of the pool of players were voted as hustle players by at least half of the sample (Kawhi Leonard and Danny Green, both of the San Antonio Spurs). Five NBA athletes out of 100 were selected as hustle players by at least one-third of the sample. These results indicated that hustle was an agreed upon characteristic of specific players and that some players demonstrated more observable trait hustle than others.

![High Hustle Players in the NBA](chart.png)

*Figure 3 - NBA Players rated as high hustle players (by frequency)*
Uniqueness

The similarity of other constructs to the proposed construct of hustle was examined (Table 1). The constructs that emerged as most important to hustle were motivation and grit with the least important being external locus of control and intelligence. A one-sample Wilcoxon signed rank test using the median of 3 (the midpoint on the scale between 1 = “Very Unimportant” and 5 = “Very Important”) determined that motivation, grit, personality, internal locus of control, growth mindset, and self-efficacy were significantly different from a midpoint of 3. External locus of control and intelligence were not significantly different.
Table 1

<table>
<thead>
<tr>
<th>Construct</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation</td>
<td>5*</td>
<td>0.60</td>
</tr>
<tr>
<td>Grit</td>
<td>5*</td>
<td>0.78</td>
</tr>
<tr>
<td>Personality</td>
<td>4*</td>
<td>0.84</td>
</tr>
<tr>
<td>Internal Locus of Control</td>
<td>4*</td>
<td>0.89</td>
</tr>
<tr>
<td>Growth Mindset</td>
<td>4*</td>
<td>0.78</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>4*</td>
<td>0.94</td>
</tr>
<tr>
<td>Intelligence</td>
<td>3</td>
<td>1.04</td>
</tr>
<tr>
<td>External Locus of Control</td>
<td>3</td>
<td>1.10</td>
</tr>
</tbody>
</table>

*p < 0.01; 1 = “Very Unimportant” to 5 = “Very Important”

Performance Metrics

Participants ranked commonly used basketball performance metrics on their representativeness of hustle. Results determined that metrics related to possessing the ball (e.g. rebounds, steals, and blocks) were ranked as the four most representative metrics (Table 2). Metrics more commonly associated with scoring or fouls were ranked as less representative of hustle.
### Table 2
*Performance metric median ratings (ascending)*

<table>
<thead>
<tr>
<th>Performance Metric</th>
<th>Median</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offensive Rebounds</td>
<td>1</td>
<td>1.01</td>
</tr>
<tr>
<td>Defensive Rebounds</td>
<td>2</td>
<td>1.04</td>
</tr>
<tr>
<td>Steals</td>
<td>3</td>
<td>1.66</td>
</tr>
<tr>
<td>Blocks</td>
<td>5</td>
<td>1.53</td>
</tr>
<tr>
<td>Ability to get the Free Throw Line</td>
<td>5</td>
<td>2.16</td>
</tr>
<tr>
<td>Assists</td>
<td>7</td>
<td>1.82</td>
</tr>
<tr>
<td>Minutes Played</td>
<td>8</td>
<td>3.00</td>
</tr>
<tr>
<td>Shooting Percentage</td>
<td>8</td>
<td>2.11</td>
</tr>
<tr>
<td>Personal Fouls</td>
<td>9</td>
<td>2.45</td>
</tr>
<tr>
<td>Turnovers</td>
<td>9</td>
<td>1.85</td>
</tr>
<tr>
<td>Points Scored</td>
<td>10</td>
<td>1.99</td>
</tr>
</tbody>
</table>

**Other Hustle Elements**

Participants reported other elements of hustle that were not initially presented in the preliminary survey. A coding scheme was developed to address the different subjective responses given by the participants. Fifty-one open-responses were recorded and organized into groups that captured the main idea of the comments, such as physical performance actions, desire, perseverance, etc. (Table 3). The most prevalent open-responses centered around physical actions, such as deflections, taking a charge, or diving on the floor in a game or practice. Other indicators included desire, effort, selflessness, perseverance, commitment, dedication, heart, and tenacity.
**Table 3**  
*Participant responses by category*

<table>
<thead>
<tr>
<th>Term/Concept</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Performance</td>
<td>19</td>
</tr>
<tr>
<td>Desire</td>
<td>5</td>
</tr>
<tr>
<td>Effort</td>
<td>5</td>
</tr>
<tr>
<td>Selflessness</td>
<td>4</td>
</tr>
<tr>
<td>Perseverance</td>
<td>3</td>
</tr>
<tr>
<td>Commitment</td>
<td>2</td>
</tr>
<tr>
<td>Heart</td>
<td>2</td>
</tr>
<tr>
<td>Tenacity</td>
<td>2</td>
</tr>
<tr>
<td>Communication</td>
<td>1</td>
</tr>
<tr>
<td>Fearlessness</td>
<td>1</td>
</tr>
<tr>
<td>Scrappiness</td>
<td>1</td>
</tr>
<tr>
<td>Self-doubt</td>
<td>1</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>1</td>
</tr>
<tr>
<td>Focus</td>
<td>1</td>
</tr>
<tr>
<td>Leadership</td>
<td>1</td>
</tr>
<tr>
<td>Relationship</td>
<td>1</td>
</tr>
<tr>
<td>Passion</td>
<td>1</td>
</tr>
</tbody>
</table>

**Conclusions**

Results from the preliminary survey demonstrated the absence of a universal understanding of hustle. However, coaches showed convergence on specific individuals that were deemed to have high levels of hustle, indicating a consistent understanding of hustle. Hustle-related performance metrics were based on securing possession of the ball for one’s team in the form of rebounds (both offensive and defensive) and stealing the ball from the
opponent. This signified that hustle within the domain of basketball hinged on the establishment and attainment of possession. Whether this involves acquiring or maintaining possession should be explored further. It was noted that like many team sports, basketball only has one ball which is trying to be possessed by both teams and possession is a key element in achieving victory. With a heightened emphasis on possessing the single ball, actions made to establish possession could be overemphasized in importance. While possession statistics showed importance in hustle, all metrics in future studies should be explored to examine how levels of performance can might relate to levels of hustle.

Hustle did receive mixed results in its identification as a unique construct as it was uniquely defined yet shown to be important to other constructs. Questions in this section prompted respondents to report how important a construct was to the perceived construct of hustle - not how different. The wording of this question hindered the researcher’s ability to identify the uniqueness of hustle. Future surveys addressed uniqueness more directly by questioning how synonymous hustle was to specific constructs.

The final section of the preliminary survey offered evidence that hustle was demonstrated through physical action, such as “diving on a ball.” These results exhibited the importance of tracking performance data in future studies. Other responses included components of hustle not easily identifiable or observed, such as desire, selflessness, and commitment. While these constructs might not be visually observable, they may be able to be identified through previously established questionnaires.
Limitations

Although the sample was suitable for a preliminary study, the sample was low in coaching experience and diversity. Questions regarding uniqueness lacked clarity in understanding if specific constructs were similar to hustle by asking how “important a construct was to hustle.”
Chapter 4: Study 1 - Identification

Introduction

The primary step of the overall research was to establish a working definition of the trait hustle from experts in the relevant field. The research team focused on the athletic domain of competitive basketball as it was a domain in which hustle was frequently observed.

For this research, hustle was considered a trait (e.g. a person who is a hustle player) and not a verb or action (e.g. a person who hustles after a ball). Since hustle could be viewed in a negative light (e.g., a pool player hustling an opponent out of their money) or a positive light (e.g., a player who demonstrates effort and hustle during a game), participants were told to consider the trait of hustle in a positive context. Study 1 also explored the uniqueness of the construct of hustle as it pertains to other psychological constructs and performance metrics indicative of hustle.

The Delphi Method

Researchers used the Delphi method of expert consensus to establish a definition of hustle. The Delphi method, developed by Norman Dalkey of the RAND Corporation in the 1950’s, was originally purposed to provide a method of expert forecasting and selection for a U.S. sponsored military project (Dalkey & Helmer, 1963). This original Delphi method relied on four tenets: 1) the anonymity of Delphi participants, 2) the use of an iterative process, 3) the use of controlled feedback, and 4) the statistical aggregation of group response (Rowe & Wright, 1999). Although the original Delphi method addressed issues related to forecasting and analysis, the method has evolved to be “an iterative process used to
collect and distill the judgments of experts using a series of questionnaires interspersed with feedback” (Skulmoski, Hartman, & Krahn, 2007, p. 2). Consequently, the Delphi method has been leveraged in structured group problem solving and the establishment of structured models (Linstone & Turloff, 1975). The Delphi method has also been previously used in instances when an incomplete understanding of a problem or phenomena existed, when subjective judgments of individuals on a collective basis are necessary (Adler & Ziglio, 1996), or in the investigation of a phenomena or construct that does not yet exist (Czinkota & Ronkainen, 1997; Skulmoski, Hartman, and Krahn, 2002). For these reasons, the Delphi method was an appropriate method for establishing a consensus understanding of long-term hustle.

**Hypotheses**

The research team investigated the following hypotheses:

H1. A definition of hustle can be established by a panel of experts;

H2. Hustle will be identified as a unique construct.

H3. Hustle will not be considered synonymous with previously established psychological constructs of perseverance, tenacity, passion, grit, motivation, or effort;

H4. Performance metrics associated with obtaining possession (i.e. rebounds and steals) will be rated as indicative of hustle by the expert panel.
Method

Participants

The selection of research participants was identified as a critical step in the Delphi method (Skulmoski, Hartman, & Krahn, 2002). For the research, participants were required to meet a series of criteria and expectations regarding expertise and availability for inclusion (Adler & Ziglio, 1996). Skulmonski, Hartman, & Krahn (2002) recommended recruiting between 10-15 per questionnaire item and using a homogenous sample. Study 1 participants were required to meet three requirements: 1) minimum of 5 years’ experience as a basketball coach; 2) capacity and willingness to participate; and 3) effective communication skills.

Participants were recruited from a pool of 2,530 U.S. high school basketball coaches. Each coach in the initial pool was sent a general recruitment email with a link to an initial Round 1 Questionnaire (described below). From the initial pool, 86 coaches responded and participated in the survey with 82 completing the survey. From the sample of 82 coaches, 15 were selected that met the participant criteria (demographics were not collected in Round 1). Effective communication was determined by interpretability of responses by the lead researcher. Some form of compensation was involved for each round in which the participant participated, whether guaranteed in Round 1 and 2 or given at random in Round 3.

Attrition did occur with the expert panel during the Delphi method. Of the original 15 participants, 13 participated in Round 2. These 13 participants reported an average coaching experience of 12.8 years (Range: 5-30). Five of the 13 respondents were female and 11 identified their primary profession as “teacher.” Five coaches overall dropped from
the study (3 females, 2 males), leaving 10 coaches in the study for Round 3. The study concluded after Round 3 responses were collected.

Materials

**Round 1 questionnaire.** The Round 1 questionnaire was used for two purposes: 1) to screen participants, and 2) to solicit open-ended responses to preliminary questions regarding hustle. After completing an informed consent, Round 1 required participants to provide contact information and demographic information. Round 1 then presented three open-ended questions focused on the construct of long-term hustle:

Q1. Please define the trait of long-term hustle in a context related to athletics.

Q2. Are there any previously established individual characteristics or terms that are synonymous with long-term hustle? Some example individual characteristics may include height, motivation, intelligence, grit, neuroticism, mindset, conscientiousness, confidence, locus of control, extroversion, etc. These characteristics should not include individual actions such as diving for the ball, boxing out an opponent, running hard, etc.

Q3. Are there any commonly tracked statistics or metrics within the sport of basketball that are indicative of long-term hustle? Commonly tracked statistics can include, but are not limited to points, offensive rebounds, defensive rebounds, minutes played, fouls, etc.

**Round 2 questionnaire.** The Round 2 survey expanded on expertise and demographic inquiries by including questions addressing highest level of coaching experience and also primary profession. For further questions in the survey regarding hustle,
researchers presented the same questions used in Round 1 but included a participant’s previous responses from the previous survey. Per the Delphi method, this was intended to remind the participant of the prior round response and was done for Questions 1-3. Another major difference for Round 2 was the introduction of a multiple-choice response for each question, whereas before in Round 1 responses were open-ended text. To create the multiple-choice response options, researchers analyzed Round 1 open-ended responses and formulated a series of options for each question.

For Question 1 regarding a definition of long-term hustle, the research team formulated 6 possible definitions of hustle from the open-ended responses in Round 1 and presented these to the expert participant along with their response from Round 1. The element of effort was consistent throughout each definition, but varied in effort relativity and effort duration between 6 optional hustle definitions. Expert panel participants were asked to rate the appropriateness of each definition on a 5-point Likert scale with anchors “Completely Inappropriate” to “Completely Appropriate.”

Similar to Question 1, researchers analyzed Round 1 responses to Question 2 regarding construct uniqueness and grouped responses into similar categories that aligned with previously established constructs. The research team first presented the participant’s previous response and then the 6 most frequently chosen constructs (e.g., grit, determination, motivation, desire, toughness, or focus) collected from R1. Participants then observed and rated the constructs on how synonymous certain constructs were to hustle of a 5-point Likert scale with anchors “Completely Not Synonymous” and “Completely Synonymous.” The
most frequently chosen constructs were motivation, desire, grit, determination, toughness, and focus.

This process was repeated for Question 3 by presenting a participant’s previous response in Round 1 and the 8 most frequently submitted responses from Round 1 – Question 3. Expert participants in Round 2 were asked to rate which performance metrics were indicative of hustle. Participants were presented with the 8 most frequently reported metrics and rated each metric on hustle on a 5-point Likert scale with anchors “Completely Non-Indicative” and “Completely Indicative.”

**Round 3 questionnaire.** The Round 3 questionnaire again expanded on demographic information by asking participants their gender. Further questions used findings from Round 2 to finalize a definition of hustle, constructs synonymous with hustle, and performance metrics indicative of hustle. In Round 3, participants were presented with the original questions from Round 1 and the cumulative group responses from previous round per the Delphi method. Participants were then asked to rate the appropriateness of one definition that was rated as the most appropriate definition of hustle from Round 2 on a 5-point Likert scale with the anchors “Disagree Completely” to “Agree Completely”. Participants were then given the opportunity in two open-response fields to explain why they did or did not agree with the proposed definition and how they would change the definition.

For Round 3 – Question 2, the researchers presented Round 2 group ratings of the 6 constructs that were noted as possibly synonymous with hustle. Round 3 – Question 2 then asked the expert participants to explain why the constructs of desire and determination were
rated as most similar to hustle in an open-response field. Participants were also asked if they thought that any construct was effectively the same as hustle and to explain their reasoning.

For Round 3 – Question 3, the researchers again presented group ratings from Round 2 for the 8 performance metrics most frequently chosen as indicative of hustle. Expert participants were then asked if the two highest rated metrics of loose balls recovered and dives of the floor were the most indicative measurements of hustle and to explain their reasoning. A following question asked if the participant which measures should be included in an overall measure of hustle and an explanation of their reasoning.

Procedure

The Delphi Method commenced with a recruitment email and progressed through a series of three rounds until consensus was achieved (Figure 5). Consensus was defined as majority acceptance of a derived definition, similar constructs, and indicative performance metrics by the sample. Each questionnaire used in each round was derived from a previous round’s responses and was approved by an Institution Review Board before being disseminated.

Round 1. Round 1 was administered to the sample of 2,530 individual coaches to solicit responses to the three Round 1 questions. An email was sent to the sample of coaches that included a link to the online questionnaire. Individuals completed the questionnaire via the online survey platform Qualtrics.

Round 2. After analyzing responses to Round 1 questions, the research team created an updated questionnaire for Round 2 using responses from 15 selected individuals. Individuals chosen for the expert panel were then sent a link to the new Round 2
questionnaire. Participants were reminded of their previous responses per question and then asked to complete the online questionnaire via Qualtrics to measure consensus.

**Round 3.** Round 3 solicited responses from the same fifteen individuals chosen for the expert panel in Round 2. Each individual was emailed a link to access the Round 3 online survey. Individuals were presented with the highest rated definition of hustle for Question 1 and then group ratings from Round 2 for Question 2 and 3. At the conclusion of Round 3, researchers analyzed responses for consensus to determine if future rounds were necessary, which they were not as the majority of participants agreed with the derived definition, synonymous constructs, and indicative metrics.
Figure 5 - Delphi Method
Results

Definition

Hypothesis 1: A definition of long-term hustle will be established by a panel of experts.

A definition of long-term hustle was established and agreed to by the panel of expert participants. Long-term hustle was defined as “the consistent display of effort that is higher than a peer group’s normal effort that occurs over an extended period of time beyond a single competitive event.” The definition contained three main elements relevant for understanding long-term hustle: 1) the manifestation of effort as an observable trait, 2) the consistent nature of this displayed effort over a period of time, and 3) the comparison of effort to a peer group’s normal effort. Participants reported complete agreement with the definition (n = 4, M = 5.00, SD = 0.00).

Uniqueness

Hypothesis 2: Hustle will be identified as a unique construct.

Results from Study 1 did not support Hypothesis 2. Hustle was not determined to be unique as a construct as it received high ratings of similarity with 6 other constructs: desire, determination, motivation, grit, toughness, and focus (Table 4). A one-sample Wilcoxon signed rank test using the median of 3 (the midpoint on the scale between “Completely Not Synonymous” and “Completely Synonymous”) determined that all constructs were significantly different from 3. Therefore, hustle was rated as fairly synonymous with all 6 other constructs. This finding suggests that trait hustle might be an overarching composite term for multiple constructs.
Table 4

Constructs rated for synonymy

<table>
<thead>
<tr>
<th>Construct</th>
<th>Rating (M)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire</td>
<td>4.53**</td>
<td>0.52</td>
</tr>
<tr>
<td>Determination</td>
<td>4.53**</td>
<td>0.52</td>
</tr>
<tr>
<td>Motivation</td>
<td>4.15**</td>
<td>0.69</td>
</tr>
<tr>
<td>Grit</td>
<td>4.15**</td>
<td>0.69</td>
</tr>
<tr>
<td>Toughness</td>
<td>4.08**</td>
<td>1.04</td>
</tr>
<tr>
<td>Focus</td>
<td>4.08**</td>
<td>0.64</td>
</tr>
</tbody>
</table>

**p < .01; 1 = Completely Not Synonymous to 5 = Completely Synonymous

Hypothesis 3: Hustle will not be considered synonymous with previously established psychological constructs of perseverance, tenacity, passion, grit, or effort.

Hustle was not rated as synonymous with 3 of the 5 mentioned constructs in the hypothesis (perseverance, tenacity, passion, or effort) by the expert panel during the Delphi method. However, since effort was included within the definition of long-term hustle for Question 1, its similarity to effort must be taken into consideration. In examining the similarity between hustle and grit, the one-sample Wilcoxon signed rank test determined that grit was significantly different from the hypothesized median of 3 (Table 4).

Performance Metrics

Hypothesis 4: Performance metrics associated with obtaining possession (i.e. rebounds and steals) will rated as indicative of hustle by the expert panel.

Researchers examined the relationship of all 8 performance metrics to hustle. Of those 8 metrics, 6 were associated with obtaining possession (loose ball recoveries, charges
taken, steals, offensive rebounds, total rebounds, and defensive rebounds; Table 5). A one-sample Wilcoxon signed rank test using the median point of 3 determined that all performance metrics except for defensive rebounds failed to reject the null hypothesis.

<table>
<thead>
<tr>
<th>Performance Metrics</th>
<th>Rating (M)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose ball Recovered</td>
<td>4.77**</td>
<td>0.44</td>
</tr>
<tr>
<td>Dives on the Floor</td>
<td>4.54**</td>
<td>0.66</td>
</tr>
<tr>
<td>Deflections</td>
<td>4.38**</td>
<td>0.65</td>
</tr>
<tr>
<td>Charges Taken</td>
<td>4.15**</td>
<td>0.80</td>
</tr>
<tr>
<td>Steals</td>
<td>3.85**</td>
<td>0.80</td>
</tr>
<tr>
<td>Offensive Rebounds</td>
<td>3.77**</td>
<td>0.44</td>
</tr>
<tr>
<td>Total Rebounds</td>
<td>3.77**</td>
<td>0.44</td>
</tr>
<tr>
<td>Defensive Rebounds</td>
<td>3.54</td>
<td>0.97</td>
</tr>
</tbody>
</table>

**p < .01; 1 = Completely Not Indicative to 5 = Completely Indicative

**Table 5**

*Constructs rated for hustle indicativeness*

Conclusions

A panel of experts in Study 1 established an accepted definition of long-term hustle (Hypothesis 1), partially verified its uniqueness (Hypotheses 2 and 3), and identified performance metrics indicative of the trait of hustle (Hypothesis 4). The display of effort was identified as a main element of the trait of hustle. Initially participants varied in their responses regarding how effort should be compared to norms and the duration of effort necessary to exhibit high trait hustle in Round 1. The manipulation of these components determined that hustle was apparent if effort was above that of a peer group’s normal effort.
and if that effort maintained over an extended period of time beyond a single competitive event. Therefore, the observance of hustle required the presence or at least the understanding of effort norms in a specific situation. It also requires the tracking of displayed effort over time in order to fully acknowledge an individual as having the trait of long-term trait hustle.

While trait hustle was distinguishable in definition, evidence suggested that the construct of hustle could contain elements or sub-factors of other constructs, particularly effort, desire, determination, and grit. Since effort was a major element of the definition and desire, determination, and grit were seen as related to hustle, it was difficult to assume that hustle was altogether unique in nature. This suggested that hustle was an umbrella term for other sub-constructs. Thus, elements from scales were seen as imperative for inclusion in the future establishment of a hustle scale in Study 2.

Since performance metrics are such an integral part of athletics and sports culture, it was also important to identify which metrics were the most indicative of hustle. The NBA has used performance metrics of blocks, steals, contested shots, charges drawn, deflections, and loose balls recovered for tracking hustle (Concepcion, 2015; Reynolds, 2015; Vandeusen, 2015). The results from Study 1 aligned with the majority of these previously noted statistics and confirm that loose balls recovered, deflections, charges drawn, and steals were indicative of hustle. However, the results of the Delphi method suggested that the NBA was lacking in their inclusion of dives, offensive rebounds, and total rebounds in their assessment of hustle. It was therefore recommended that hustle measures in professional basketball should incorporate these observable displays of effort.
Chapter 5: Study 2 - Development of a Hustle Scale

Introduction

Constructs that represent phenomena can be difficult to observe or directly measure (Hinkin, 1998). When creating a new construct, it is essential to establish a valid and reliable tool that can measure the particular phenomenon in question (Schoenfeldt, 1984). In Study 2, a scale was created to assess individual hustle. This was accomplished by following the prescribed process of measure development outlined by Hinkin (1998). Once developed, the self-assessment scale was adapted to be used by peers.

Method

Hinkin (1998) outlined the process of scale development in 6 steps: 1) Item Generation, 2) Questionnaire Administration, 3) Initial Item Reduction, 4) Confirmatory Factor Analysis, 5) Convergent/Discriminant Validity, and 6) Replication. In Study 2 researchers aimed at creating an initial scale using Hinkin’s first 4 steps and reserved the determination of validity and replication for future studies.

Participants

Hinkin (1998) advocated for the use of several independent samples in the scale development process when possible. This study used participants from a previously recruited sample of basketball domain experts (coaches from Study 1) and basketball players at local gymnasiums.

Relevance assessment sample. The research team leveraged the sample of 3 expert coaches from Study 1 to assist with determining the relevance of items in the hustle scale.
Coaches in Study 2 had a mean coaching experience of 11.33 years (SD = 4.16 years). The 3 coaches used for relevance ratings from Study 2 were not compensated for their involvement.

**Scale development sample.** A sample of 326 basketball athletes was recruited to ensure statistical significance for the exploratory factor analysis and the confirmatory factor analysis (Schwab, 1980; Guadagnoli & Velicer, 1988). These participants were largely university students or employees (Table 6).
Recruitment. All athlete participants were recruited by the research team at the university gymnasium. Athletes were either playing standard recreational basketball or were competing in a 3 versus 3 (3v3) intramural league. The research team approached individuals at the gymnasium who were either playing or preparing to play a game of
basketball. The researcher informed the athletes about the research project and offered a chance for involvement. Each athlete received a beverage for their participation and also had the opportunity to enter a lottery to win $100.

Materials

**Self-reported hustle questionnaire.** A questionnaire was created that assessed participant demographics and hustle. The questionnaire contained 16 questions aimed to address hustle (Appendix B). The questionnaire included demographic questions for further participant insights. Demographic questions addressed variables such as age, ethnicity, GPA, experience playing basketball in years, hours per week playing basketball, highest level of competitive basketball participation, and any player awards or recognitions.

**Peer-reported hustle questionnaire.** Each participant was randomly assigned to rate a teammate on their hustle. Questions were reworded to solicit responses regarding other athletes (e.g. “I am a hustle player” in the self-reported questionnaire was changed to “This player is a hustle player” in the peer-reported hustle questionnaire; Appendix C). Demographic questions from the self-reported questionnaire were omitted and questions regarding the relationship of the peer to the rated player were added to assess the familiarity of the two players.

**Game materials.** For the game portion of the study, athletes wore distinguishing jerseys and were video recorded by the research team. The research team provided all equipment and all games occurred at a university gymnasium.
Procedure

**Self-reported questionnaire creation.** The research team generated 54 items for an initial questionnaire using deductive scale development described by Hinkin (1998) and Schwab (1980; Appendix B). A theoretical foundation for generated items was provided by findings from the previous study findings. The research team generated items that aligned with the established definition from Study 1, other constructs theorized as similar to hustle, and performance metrics identified as indicative of hustle. During item generation, researchers followed guidelines set forth by Hinkin (1998) by making statements as short and simple as possible, using language familiar to target respondents, avoiding “double-barreled” items that solicited responses on two items in one question, avoiding leading questions, and avoiding items that would solicit group responses with little variability (p. 108). Items used Likert-type scales with anchor points “Not like me at all” and “Very much like me” (Kerlinger, 1986; Duckworth, Peterson, Matthews, & Kelly, 2007). Items that were deemed inconsistent or redundant were eliminated.

**Constructs similar to long-term hustle.** The research team leveraged items from scales used to measure synonymous constructs such as desire, determination, motivation, and grit. To tap into elements of player desire researchers used items designed to address verbal perseveration and imaginal prefiguration (Desire Thinking Questionnaire; Caselli & Spada, 2011) and items that addressed continuation desire (Schoenau-Fog, 2011). Items from self-determination and motivation scales (Motive for Physical Actives Measure-Revised [MPAM-R]) and subjective vitality scales (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997) were adapted to capture determination and motivation. Items from the MPAM-R sub-scales
of competence, fitness, and enjoyment were leveraged as inspiration for items used in the hustle questionnaire. Items addressing motivation were translated from the Intrinsic Motivation Inventory (IMI) effort and importance sub-scales (McAuley, Duncan, Tammen, 1987) and Herman’s (1970) questionnaire of Achievement Motivation. All items from the Grit-S scale were included in the initial item generation to assess self-reported grit in the hustle questionnaire (Duckworth, Peterson, Matthews, & Kelly, 2007).

**Performance metrics.** Items were generated to capture performance actions identified previously as indicative of hustle by both the NBA (Concepcion, 2015; Reynolds, 2015; Vandeusen, 2015) and the expert panel of coaches in Study 1. These items focused on having respondents rate their propensity and enjoyment in performing specific basketball actions of going after loose balls, diving on the floor during games, deflecting the basketball, taking charges while on defense, and contesting shots.

**Researcher generated items.** Using feedback and results gathered in Study 1, the research team also developed items not captured by other scales or performance metrics noted above. These items were geared to address elements of satisfaction of engaging in hustle, comparative hustle related to group norm effort, anticipated success as related to hustle, consistency in hustle, and pride in hustle.

**Validity assessment questionnaire.** An item content validity assessment was conducted on the initial set of 54 items where 3 coaches rated the relevance of each item in the questionnaire on a 4-point Likert scale with anchors “Not Relevant” to “Very Relevant.” Items that were deemed the most relevant by the coaches in assessing hustle were maintained for the self-reported hustle questionnaire. Researchers also eliminated less relevant items to
maintain a more parsimonious scale. At the conclusion of the item content validity assessment, 16 items were maintained for the self-reported hustle questionnaire.

**Game play.** Once informed consent was given, athletes formed teams of three to engage in a competitive game of 3v3. Some teams were preformed prior to competition and some teams consisted of more than 3 athletes that would substitute during the game. The athletes wore a given jersey and then informed of the rules of the 3v3 game (Appendix D). All participants were assumed to understand basic rules of competitive basketball. At the completion of the 3v3 game athletes were given the self-report and peer-report questionnaires. After submission of the questionnaires participants were given a drink and debriefed on the purpose of the research study. Athletes were communicated with via email after the study to thank each person for their participation and inform the lottery winners of their prizes.

**Results**

**Exploratory Factor Analysis**

**Data screening.** Data was initially screened by researchers. Any discrepancies with the scale or participant responses (e.g. two responses to one question or unclear response selection) were recoded as missing data. The minimum amount of observations was satisfied with a sample size of 161 for the exploratory factor analysis (EFA) and 165 for the confirmatory factor analysis (CFA).

**Inter-item correlations.** A Spearman’s rank-order correlation was completed on the items to determine which items correlated at a minimum of .4 with all other variables (Table 7; Kim & Mueller, 1978). Although not all correlations were below the prescribed .4,
researchers determined that items 1, 2, and 10 could be eliminated from future analysis due to overall low correlations.

**Initial exploratory factor analysis.** After initial inter-item correlation reduction, an EFA was used to further refine the scale to a smaller set of 13 items (Hinkin, 1998). For the initial EFA, the research team divided the sample into two groups. Players in the same game were kept in the same group. The EFA used 161 athletes of the total sample of 326 (26 of the total 52 game sessions). An initial EFA was conducted on the 13 remaining items with an oblique rotation (promax), providing a ratio of over 12 cases per item. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .92 (‘superb’ according to Field, 2009), and all KMO values for individual items were greater than .88 which exceeded the acceptable limit of .5 (Field, 2009). Bartlett’s test of sphericity $\chi^2(78) = 1190.83, p < .01$, indicated that correlations between items were sufficiently large. An initial analysis was run to obtain eigenvalues for each component in the data. Two components had eigenvalues over Kaiser’s criterion of 1 and explained 62.75% of the variance. A scree plot showed inflexions of the factors loadings (Figure 6 - *Scree plot of Initial EFA;* Cattell, 1966). Table 8 shows the factor loadings after rotation.
<table>
<thead>
<tr>
<th>Items</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) I enjoy contesting shots during my games.</td>
<td></td>
<td>.24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2) It is important for me to take charges during my games.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3) I am diligent (hardworking and careful).</td>
<td>.40</td>
<td>.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4) It is important for me to recover loose balls during my games.</td>
<td>.37</td>
<td>.30</td>
<td>.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5) Providing high effort is stimulating.</td>
<td>.36</td>
<td>.29</td>
<td>.55</td>
<td>.55</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6) Working hard helps me maintain new skills.</td>
<td>.32</td>
<td>.28</td>
<td>.46</td>
<td>.48</td>
<td>.65</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) I like playing with a higher level of effort than my peers.</td>
<td>.31</td>
<td>.30</td>
<td>.48</td>
<td>.47</td>
<td>.50</td>
<td>.45</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>8) When I am competing, the demands I make upon myself are very high.</td>
<td>.31</td>
<td>.29</td>
<td>.36</td>
<td>.38</td>
<td>.44</td>
<td>.50</td>
<td>.56</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7 Continued

<table>
<thead>
<tr>
<th>Item</th>
<th>Correlation Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>9) I am a hard worker.</td>
<td>0.30 0.26 0.54 0.47 0.55 0.54 0.55 0.57 -</td>
</tr>
<tr>
<td>10) It is important for me to get deflections during my games.</td>
<td>0.50 0.27 0.29 0.45 0.39 0.34 0.37 0.35 0.41 -</td>
</tr>
<tr>
<td>11) I like working hard.</td>
<td>0.29 0.25 0.52 0.47 0.63 0.57 0.54 0.48 0.70 0.42 -</td>
</tr>
<tr>
<td>12) Working hard helps me attain new skills.</td>
<td>0.23 0.26 0.39 0.33 0.53 0.62 0.42 0.40 0.50 0.30 0.58 -</td>
</tr>
<tr>
<td>13) I put a lot of effort into competition.</td>
<td>0.35 0.21 0.45 0.47 0.50 0.47 0.56 0.54 0.58 0.42 0.57 0.47 -</td>
</tr>
<tr>
<td>14) I continue to work hard until I reach my goal.</td>
<td>0.27 0.20 0.41 0.39 0.41 0.49 0.47 0.47 0.35 0.35 0.56 0.50 0.60 -</td>
</tr>
<tr>
<td>15) It is important to me to put effort into my training and</td>
<td>0.29 0.24 0.45 0.41 0.47 0.48 0.55 0.52 0.42 0.42 0.59 0.53 0.61 0.65 -</td>
</tr>
<tr>
<td>competition.</td>
<td></td>
</tr>
<tr>
<td>16) I am a hustle player.</td>
<td>0.36 0.26 0.50 0.57 0.55 0.44 0.53 0.40 0.44 0.44 0.61 0.38 0.57 0.47 0.52 -</td>
</tr>
</tbody>
</table>

*Note: all items were correlated at (p < .01)*
Figure 6 - Scree plot of Initial EFA
Table 8
Factor loadings for initial EFA

<table>
<thead>
<tr>
<th>Items</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>14) I continue to work hard until I reach my goal.</td>
<td>.90</td>
<td>-.13</td>
</tr>
<tr>
<td>12) Working hard helps me attain new skills.</td>
<td>.84</td>
<td>-.15</td>
</tr>
<tr>
<td>15) It is important to me to put effort into my training and competition.</td>
<td>.75</td>
<td>.03</td>
</tr>
<tr>
<td>13) I put a lot of effort into competition.</td>
<td>.67</td>
<td>.12</td>
</tr>
<tr>
<td>6) Working hard helps me maintain new skills.</td>
<td>.65</td>
<td>.10</td>
</tr>
<tr>
<td>8) When I am competing, the demands I make upon myself are very high.</td>
<td>.63</td>
<td>.08</td>
</tr>
<tr>
<td>9) I am a hard worker.</td>
<td>.52</td>
<td>.36</td>
</tr>
<tr>
<td>11) I like working hard.</td>
<td>.49</td>
<td>.41</td>
</tr>
<tr>
<td>3) I am diligent (hardworking and careful).</td>
<td>-.12</td>
<td>.88</td>
</tr>
<tr>
<td>4) It is important for me to recover loose balls during my games.</td>
<td>-.09</td>
<td>.70</td>
</tr>
<tr>
<td>16) I am a hustle player.</td>
<td>.03</td>
<td>.70</td>
</tr>
<tr>
<td>5) Providing high effort is stimulating.</td>
<td>.09</td>
<td>.65</td>
</tr>
<tr>
<td>7) I like playing with a higher level of effort than my peers.</td>
<td>.29</td>
<td>.44</td>
</tr>
</tbody>
</table>

Items that did not have a loading of .40 and/or load twice as strong on the appropriate component than any other component were not retained (Hinkin, 1998). Consequently, researchers eliminated items 7, 9, and 11 from future use and analysis.

Secondary EFA. A second EFA was conducted on the remaining 10 variables with an oblique rotation (promax). KMO verified that the sample was adequate for the analysis, KMO = .89 (‘great’ according to Field, 2009) and all individual item KMO values were
greater than or equal to .85. Bartlett’s test of sphericity \( \chi^2 (55) = 764.07, p < .01 \), indicated that correlations between items were sufficiently large. The second EFA determined that 2 components had eigenvalues over Kaiser’s criterion of 1 and explained 63.53% of the variance, an increase in variance explained by the initial EFA.

Table 9  
Table 9 shows the factor loadings after rotation. Factor 1 was named “Goal Effort” as most statements related to the acquisition or attainment of a goal. Factor 2 was named “Personal Effort” as most items related to internal assessments of a trait or action.

Table 9  
*Factor loadings for secondary EFA*

<table>
<thead>
<tr>
<th>Items</th>
<th>Goal Effort</th>
<th>Personal Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>14) I continue to work hard until I reach my goal.</td>
<td>.86</td>
<td>-.08</td>
</tr>
<tr>
<td>12) Working hard helps me attain new skills.</td>
<td>.80</td>
<td>-.09</td>
</tr>
<tr>
<td>15) It is important to me to put effort into my training and competition.</td>
<td>.75</td>
<td>.04</td>
</tr>
<tr>
<td>13) I put a lot of effort into competition.</td>
<td>.66</td>
<td>.14</td>
</tr>
<tr>
<td>6) Working hard helps me maintain new skills.</td>
<td>.62</td>
<td>.17</td>
</tr>
<tr>
<td>8) When I am competing, the demands I make upon myself are very high.</td>
<td>.61</td>
<td>.09</td>
</tr>
<tr>
<td>4) It is important for me to recover loose balls during my games.</td>
<td>-.10</td>
<td>.76</td>
</tr>
<tr>
<td>3) I am diligent (hardworking and careful).</td>
<td>.02</td>
<td>.72</td>
</tr>
<tr>
<td>16) I am a hustle player.</td>
<td>.08</td>
<td>.66</td>
</tr>
<tr>
<td>5) Providing high effort is stimulating.</td>
<td>.11</td>
<td>.65</td>
</tr>
</tbody>
</table>
It was inferred that the hustle trait required elements of goal-directed behavior and levels of high individual effort. Therefore, an individual who demonstrated high levels of hustle trait must have both directional effort (goal oriented) and relatively high demonstrable effort as compared to the group norm (displayed personal effort).

**Internal consistency assessment.** Cronbach’s alpha was calculated for both factors. Goal Effort achieved a Cronbach’s $\alpha = .87$ and the factor of Personal Effort yielded a Cronbach’s $\alpha = .81$. Both factors achieved a level greater than .70, an indication of strong item covariance and appropriate sampling (Cortina, 1993).

**Confirmatory Factor Analysis**

The factor structure identified in the exploratory factor analysis was evaluated using a confirmatory factor analysis (CFA) on the remaining 165 athletes in the sample (Joreskog & Sorbom, 1993). A hypothesized two factor model with latent constructs Goal Effort and Personal Effort was created with items 14, 12, 15, 13, 6, and 8 loading on the latent factor of Goal Effort and items 4, 3, 16, and 5 loading on the latter latent factor of Personal Effort (Figure 7). The initial fit of the model was assessed as poor to moderate: $\chi^2 (34, 165) = 86.90, p < .01, NFI = .90, RFI = .84, CFI = .94, RMSEA = .10$. 
To improve the overall fit of the model item 12 was removed from Personal Effort and item 3 was removed from Goal Effort. These items demonstrated the lowest $R^2$ values of .38 and .40, respectively. Both items also demonstrated the lowest standardized regression weights as well, 0.62 and 0.63, respectively.

Removal of items 12 and 3 altered the fit of the model by lowering the Chi-square estimate: $\chi^2 (25, 165) = 39.65, p < .01$ (Figure 8). Fit indices increased across the board by surpassing or approaching the acceptable level of .90 ($NFI = .94$, $RFI = .89$, $CFI = .97$). RMSEA approached a more reasonable fit level of .08. Table 10 provides a summary of the standardized parameter estimates for this two-factor solution.
Figure 8 - Second CFA with item 12 and 3 removed (standardized)
Table 10
Factor loadings for Secondary CFA

<table>
<thead>
<tr>
<th>Items</th>
<th>Goal Effort</th>
<th>Personal Effort</th>
<th>Unique Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>14) I continue to work hard until I reach my goal.</td>
<td>.75</td>
<td></td>
<td>.56</td>
</tr>
<tr>
<td>15) It is important to me to put effort into my training and competition.</td>
<td></td>
<td></td>
<td>.57</td>
</tr>
<tr>
<td>6) Working hard helps me maintain new skills.</td>
<td>.67</td>
<td></td>
<td>.45</td>
</tr>
<tr>
<td>13) I put a lot of effort into competition.</td>
<td>.82</td>
<td>.67</td>
<td></td>
</tr>
<tr>
<td>8) When I am competing, the demands I make upon myself are very high.</td>
<td></td>
<td></td>
<td>.45</td>
</tr>
<tr>
<td>16) I am a hustle player.</td>
<td></td>
<td>.79</td>
<td>.62</td>
</tr>
<tr>
<td>5) Providing high effort is stimulating.</td>
<td>.80</td>
<td></td>
<td>.63</td>
</tr>
<tr>
<td>4) It is important for me to recover loose balls during my games.</td>
<td>.81</td>
<td></td>
<td>.66</td>
</tr>
</tbody>
</table>

The latent variables of Personal Effort and Goal Effort were noted to be highly correlated ($r = .88$), indicative of poor discriminant validity and existing multicollinearity or redundancy in the model (Hinkin, 1998). To explore possible multicollinearity a third CFA was conducted where the latent variables of Personal and Goal Effort were replaced with one latent variable, Hustle (Figure 9). The Chi-square estimate experienced a slight change: $\chi^2 (20, 165) = 57.23, p < .01$. Fit indices for the more parsimonious model indicated a poorer fit than the previous model with 2 latent factors: NFI = .92, RFI = .85, CFI = .94, RMSEA = .11. The poorer fit exemplified by a RMSEA value over .10 with the single latent factor
model suggested the previous CFA model with 2 latent factors of Personal Effort and Goal Effort was more appropriate.

![Figure 9 - Third CFA with one latent factor](image)

**Conclusions**

Study 2 was successful in identifying the key components of the long-term hustle scale. The original collection of 54 items developed to reflect noted similar constructs and scales was pared down to 8 overall items on 2 factors designed to tap the trait of hustle. The EFA posited that a two-factor solution with 10 items was appropriate for observing hustle that targeted Personal Effort and Goal Effort. This was confirmed by the CFA with the exception that 2 more items were eliminated from the model. Items were found to be inspired by several different scales tapping other constructs including continuation desire (Desire
Thinking Questionnaire; Caselli & Spada, 2011), self-determination (MPAM-R enjoyment and competence subscales; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997), intrinsic motivation (Intrinsic Motivation Inventory; McAuley, Duncan, Tammen, 1987), achievement motivation (Herman, 1970), and current NBA performance metrics (loose ball recovery; Concepcion, 2015; Reynolds, 2015; Vandeusen, 2015). This aligned with Study 1 that identified desire, determination, and motivation as constructs similar to the trait of hustle and also the inclusion of loose ball recoveries as a tracked performance metric for identification of hustle in the NBA. Findings did support previous assumptions that the trait of hustle might be a second-order construct composed of first-order constructs. For future work the developed 8-item scale should provide a functional scale in the identification of the hustle trait in individuals.
Chapter 5: Study 3 - Predicting Hustle

Introduction

Study 3 assessed the predictive ability of the 8-item hustle scale created in Study 2 to determine its appropriateness for future use. This was accomplished by comparing hustle ratings provided by athletes and peers. Comparisons were also made to composite hustle metrics developed by the NBA for the 2015 summer league season (Concepcion, 2015). The exploration of rating comparisons also served to assess the presence of self-presentation and social desirability effects (Guenther & Alicke, 2010; Marlowe & Crowne, 1961). The scale’s predictive ability was further assessed by comparing hustle ratings to specific performance metrics identified by professional basketball and by the expert panel in Study 1.

To determine if hustle related to success as posited by the NBA (Rain, 2016), the relationship between hustle and success was also explored by analyzing its relationship with Value Point System ratings (VPS; Hudl, 2016). The Value Point System is a composite indicator that uses points, offensive rebounds, defensive rebounds, assists, charges taken, steals, blocks, fouls, and turnovers to evaluate player performance (Hudl, 2016). Several other indicators for individual success were available to assess performance including effective field goal percentage, turnover percentage, plus/minus, player efficiency rating, win shares, etc. but were not used (Hudl, 2016). Value Point System was chosen because of its reflection of overall performance and its non-reliance on the variable of minutes played or multiple games played.
**Possession statistics**

Basketball statisticians and sports analytic experts have leveraged the concept of possession statistics to more properly convey the effectiveness of a player (Oliver, 2004). Unlike summation statistics commonly and broadly cited (e.g. total points, total assists, or total rebounds), possession statistics offer a means of standardizing player performance by measuring activities per possession within a game, season, or career. Possession metrics are not affected by game time variations which were prevalent in this research.

**Hypotheses: Study 3**

In determining the predictability of a hustle scale, researchers investigated the following hypotheses:

H5. Self-reported hustle is positively related to peer-reported hustle;

H6. Reported hustle is positively related to composite NBA hustle;

H7. Hustle is positively related to currently used NBA hustle statistics (steals, blocks, contested shots, deflections, loose balls recovered, charges taken, and screen assists);

H8. Hustle is positively related to non-NBA hustle metrics (dives on the floor, offensive rebounds, total rebounds, and defensive rebounds);

H9. Hustle is positively related to individual VPS ratings.
Method

Participants

Athletes. Athlete participants from Study 2 were utilized for Study 3 analysis (Table 6). Athletes were not assigned groups as they were in Study 2. All athletes were asked to complete both self-report and peer-report questionnaires.

Materials

Self-reported and peer-reported hustle questionnaire. Study 3 used responses from the questionnaires given in Study 2. Only responses to the 8 items identified in the scale on two factors, Personal Effort and Goal Effort, identified in Study 2 were used for analyses (Personal Effort: items 14, 15, 13, 6, and 8; Goal Effort: items 4, 16, and 5).

Video recording. Games were video recorded by the research team using a video camera mounted on a tripod for stability. Games were recorded from a static view at a corner of the court with no panning by the camera.

Performance tracking. Athlete performance metrics were tracked using a basketball statistical tracking application: Breakthrough Stats – Basketball Stats & Scoring (Breakthrough Basketball LLC, 2016). Metrics not tracked by the application (shots contested, dives on the floor, loose balls recovered, and screen assists) were tracked individually by researchers.

Procedure

Study 3 used athletes and data obtained in Study 2. No new participants were recruited for Study 3. All participant involvement and procedures for athletes were defined in Study 2.
Composite hustle metrics. To fully understand how athletes and peers rated hustle, composite metrics were created to represent a single score of hustle. These scores served as the foundation for hustle assessments and the relationships between hustle as determined by athletes and peers. These scores also served as the basis for assessing the relationships between hustle and performance metrics.

Mean self-reported hustle rating. To establish a composite self-reported hustle rating, researchers averaged each athlete’s responses from the 8-item scale from Study 2.

Mean peer-reported hustle rating. As with self-reported hustle, a composite peer-reported hustle metric was also created using the 8 items identified in Study 2.

Mean factor ratings. Means were calculated for individual ratings on the latent factors determined in Study 2: Personal Effort and Goal Effort. These means were calculated for both the self-reported ratings on each factor as well as the peer-reported ratings on each factor for each individual.

NBA composite hustle rating. For the 2015 summer league season in the NBA, composite hustle ratings were calculated using the performance metrics of 2-point contested shots, 3-point contested shots, deflections, loose balls recovered, and charges taken (Concepcion, 2015). Each metric was assigned a value related to the probability of altering the expected point value of a game and were aggregated for a composite hustle rating (2-point contested shots were worth 0.1 hustle points, 3-point contested shots were worth 0.15 hustle points, deflections were worth 0.25 hustle points, loose balls recovered were worth 0.5 hustle points, and charges taken were worth 1.75 hustle points). Since 2-point and 3-point
contested shots were not differentiated for this research, a mean of 0.125 hustle points was assigned for every contested shot.

**Player question 16.** Question 16 from the player survey was also examined as a predictor of success for individuals. This question ("I am a hustle player") was included because of its possibility of serving as the most parsimonious measure of individual hustle.

**Possessions.** Possessions were derived using Oliver’s (2004) formula: Possession = Field Goal Attempts – Offensive Rebounds – Turnovers + 0.4*Free Throw Attempts. During the games played for the study, there were no observed free throw attempts. However, individuals were given the option to shoot free throws on a defensive foul while shooting.

**Results**

**Mean Self-reported and Mean Peer-reported Hustle**

*Hypothesis 5: Self-reported hustle is positively related to peer-reported hustle.*

A Pearson correlation was conducted to assess the relationship between the different measures of self-reported and peer-reported hustle. There were significant positive relationships between mean self-reported hustle (Table 11; M = 4.15, SD = 0.65), mean peer-reported (M = 4.05, SD = 0.69), self-reported personal effort (M = 4.18, SD = 0.67), self-reported goal effort (M = 4.11, SD = 0.78), peer-reported personal effort (M = 4.05, SD = 0.72), peer-reported goal effort (M = 4.05, SD = 0.76), and Question 16 from the player assessment (M 4.15, SD = 0.93).
**Table 11**  
Correlations of measurements of hustle

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Self-reported Hustle</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Peer-reported Hustle</td>
<td>.31**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Self-reported Personal Effort</td>
<td></td>
<td>.95**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Self-reported Goal Effort</td>
<td></td>
<td>.89**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Peer-reported Personal Effort</td>
<td></td>
<td>.28**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6) Peer-reported Goal Effort</td>
<td></td>
<td>.31**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7) Question 16 – I am a hustle player</td>
<td></td>
<td></td>
<td>.76**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

**Reported Hustle and Composite NBA Hustle Rating**

*Hypothesis 6: Reported hustle is positively related to composite NBA hustle.*

A composite NBA hustle rating was created to reflect hustle on a per possession basis. Pearson correlations were conducted to assess the relationship between the average self-reported hustle, average peer-reported hustle, and NBA composite hustle. No significant correlations were reported for the relationships between average self-reported hustle to NBA composite hustle ($r = -.04, p = .53$) or average peer-reported hustle and NBA composite hustle ($r = -.08, p = .18$). No relationships were present between composite NBA hustle and the individual factors of self-reported personal effort ($r = .04, p = .53$), self-reported goal effort ($r = .02, p = .72$), peer-reported personal effort ($r = .07, p = .24$), peer-reported goal
effort \((r = .10, p = .86)\). Question 16 from the player assessment also showed no significant relationship with composite NBA hustle \((r = -.01, p = .83)\).

**Hustle and NBA Hustle Metrics**

Hypothesis 7: Hustle is positively related with currently used NBA hustle statistics (steals, blocks, contested shots, deflections, loose balls recovered, charges taken, and screen assists).

Pearson correlations were conducted to assess the relationship between hustle (self-reported, peer-reported, and NBA composite ratings) and currently used NBA hustle metrics (Table 12). All performance metrics were determined on a per possession basis for a standardized comparison. There were no significant relationships between self-reported hustle and the NBA performance metrics. Significant correlations were observed between peer-reported hustle and screen assists but in a negative direction. NBA composite hustle rated was found to have a positively significant relationship with blocks, shots contested, deflections, and loose balls recovered (since shots contested, deflections, and loose balls recovered were components of the metric this was expected). In analyzing charges drawn no individual performed the action more than once during a competitive game lending no variability to this variable. Therefore a correlation was not possible.
Table 12

*Correlations of total hustle to NBA performance metrics*

<table>
<thead>
<tr>
<th></th>
<th>Self-reported</th>
<th>Peer-reported</th>
<th>Composite NBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steals</td>
<td>.05</td>
<td>.11</td>
<td>.09</td>
</tr>
<tr>
<td>Blocks</td>
<td>.06</td>
<td>.02</td>
<td>.19**</td>
</tr>
<tr>
<td>Shots Contested</td>
<td>-.09</td>
<td>-.09</td>
<td>.73**</td>
</tr>
<tr>
<td>Deflections</td>
<td>.03</td>
<td>.01</td>
<td>.47**</td>
</tr>
<tr>
<td>Loose Balls Recovered</td>
<td>.04</td>
<td>-.14</td>
<td>.61**</td>
</tr>
<tr>
<td>Charges Drawn</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Screen Assists</td>
<td>-.11</td>
<td>-.64*</td>
<td>.29</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

These relationships were also explored for mean factor ratings and Question 16 (Table 13).

Significant relationships were reported between peer-reported goal effort and steals, shots contested, and screen assists.
Table 13
Correlations of factor hustle to NBA performance metrics

<table>
<thead>
<tr>
<th></th>
<th>Self-reported Personal Effort</th>
<th>Self-reported Goal Effort</th>
<th>Peer-reported Personal Effort</th>
<th>Peer-reported Goal Effort</th>
<th>Question 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steals</td>
<td>.31</td>
<td>.07</td>
<td>.08</td>
<td>.14*</td>
<td>-.00</td>
</tr>
<tr>
<td>Blocks</td>
<td>.06</td>
<td>.04</td>
<td>.01</td>
<td>.04</td>
<td>.02</td>
</tr>
<tr>
<td>Shots Contested</td>
<td>-.08</td>
<td>-.09</td>
<td>-.06</td>
<td>-.14*</td>
<td>-.10</td>
</tr>
<tr>
<td>Deflections</td>
<td>.02</td>
<td>.04</td>
<td>-.01</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Loose Balls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovered</td>
<td>-.03</td>
<td>.13</td>
<td>-.11</td>
<td>-.17</td>
<td>.14</td>
</tr>
<tr>
<td>Charges Drawn</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Screen Assists</td>
<td>-.09</td>
<td>-.13</td>
<td>-.62*</td>
<td>-.53*</td>
<td>-.05</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

Hustle and non-NBA Hustle Metrics

Hypothesis 8: Hustle is positively correlated with non-NBA hustle metrics (dives on the floor, offensive rebounds, total rebounds, and defensive rebounds).

Pearson correlations were conducted to assess the relationship between hustle and non-NBA hustle metrics identified as indicative of hustle in Study 1 (dives on the floor, offensive rebounds, total rebounds, and defensive rebounds; Table 14). Each metric was transformed to be observed on a per possession basis. Total rebounds were significantly related to offensive and defensive rebounds as expected ($r = .71, p < .01, R^2 = .52$ and $r = .84, p < .01, R^2 = .71$, respectively). There were no significant relationships between either self-reported or peer-reported hustle and the non-NBA performance hustle metrics. NBA composite hustle was significantly and positively related to total rebounds, offensive
rebounds, and defensive rebounds. Hustle relationships to dives on the floor were inconclusive because no individual dove on the floor more than once during a competitive game, lending no variability and prohibiting a correlational analysis.

<table>
<thead>
<tr>
<th></th>
<th>Self-reported</th>
<th>Peer-reported</th>
<th>Composite NBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dives on the floor</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Rebounds</td>
<td>-.00</td>
<td>-.02</td>
<td>.23**</td>
</tr>
<tr>
<td>Offensive Rebounds</td>
<td>.01</td>
<td>-.03</td>
<td>.23**</td>
</tr>
<tr>
<td>Defensive Rebounds</td>
<td>-.01</td>
<td>-.01</td>
<td>.14*</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

These relationships were also explored for mean factor ratings and Question 16 (Table 15). There were no significant relationships reported.
Table 15
Correlations of factor hustle to non-NBA performance metrics

<table>
<thead>
<tr>
<th></th>
<th>Self-reported</th>
<th>Self-reported</th>
<th>Peer-reported</th>
<th>Peer-reported</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Personal Effort</td>
<td>Goal Effort</td>
<td>Personal Effort</td>
<td>Goal Effort</td>
<td>16</td>
</tr>
<tr>
<td>Dives on the floor</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Rebounds</td>
<td>-.03</td>
<td>.03</td>
<td>-.01</td>
<td>-.05</td>
<td>.02</td>
</tr>
<tr>
<td>Offensive Rebounds</td>
<td>-.03</td>
<td>.07</td>
<td>-.03</td>
<td>-.03</td>
<td>.04</td>
</tr>
<tr>
<td>Defensive Rebounds</td>
<td>-.01</td>
<td>-.01</td>
<td>.01</td>
<td>-.04</td>
<td>-.01</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01

Hustle and Success

Hypothesis 9: Hustle is positively related to individual VPS ratings.

To determine if individual success was related to hustle, a Pearson correlation was conducted to assess the relationship of VPS to self-reported, peer-reported, and composite NBA hustle. Self-reported, peer-reported hustle, and composite NBA hustle were not significantly related to VPS ($r = .07, p = .21, R^2 = .01$; $r = .04, p = .45, R^2 = .00$; $r = .07, p = .26, R^2 = .00$, respectively).
Further analysis was conducted to determine if there was a relationship between hustle and team success (whether a team won or lost the game). A Pearson correlation determined that both self- and peer-reported hustle were positively related to whether an individual won or lost their particular game ($r = .17, p < .01, R^2 = .03; r = .14, p = .01, R^2 = .02$, respectively). No significant relationship was found to exist between NBA composite hustle and whether an individual won or lost their game ($r = -.07, p = .20, R^2 = .01$). No significant relationships were also observed for mean factor ratings or question 16.

**Conclusions**

Significant correlations between both self-assessments of hustle and peer assessments suggested that the derived hustle scale was a consistent predictor of reported hustle. However, it was determined that individuals rated their self-reported hustle as much higher than their peers, indicative of a self-rating bias posed by Marlowe & Crowne (1961).
a positive relationship between self-reported and peer-reported hustle, reported ratings of hustle did not align with a composite rating of hustle used by the NBA in previous years (Concepcion, 2015). This misalignment illuminated the fact that is a disparity existed between the common athlete’s understanding of hustle and professional basketball’s understanding of hustle. Subsequently, this finding diminished the assumption that hustle is reportable on a performance based scale. Although the hustle metric has emerged as advanced metric for performance measurement, the ability of that metric to be translated by non-professionals is lacking.

It was also determined that metrics indicative of hustle not included in the composite NBA hustle rating merited consideration for their inclusion. Although offensive and defensive rebounds were not included in the NBA composite hustle rating, these metrics were positively correlated with the NBA composite rating and their inclusion gave a more accurate portrayal of hustle at a performance level. Results suggested that total rebounds should also be included, but the redundancy of the measure with offensive and defensive rebounds merited its omission from use in future hustle metrics. Blocks were also related to hustle and should be included as well. Charges taken and dives were inconclusive on their inclusion in the model. Future composite metrics of hustle that are derived from performance should leverage possession based statistics for their computation to truly reflect individual performance.

No relationship between hustle and individual success was found during the study. This suggested that hustle may not be related to success on an individual level. However, a relationship was determined to exist between reported hustle and team success (whether a
team won or lost their game). This offered conflicting support to the theory that hustle is necessary for success (Reynolds, 2015). While the absence of a relationship between hustle and individual success offered a rebuttal to that assumption, the existence of a relationship between hustle and team success provided support to the argument that hustle is essential for the team.

It was also demonstrated that factor ratings for personal effort and goal effort did not demonstrate relationships to performance measures of hustle with any more strength than overall average or composite measures. This was also found for the singular question “I am a hustle player.” Therefore, it was concluded that measuring hustle is best done with a multi-item scale.

**Limitations**

Mean scores were used for individual hustle ratings which could have hindered the ability of the research to properly create one metric for measuring hustle. It is plausible that some items within the questionnaire were more indicative of hustle than others and these items deserved more weighting than others in the formation of a composite metric.

This research study was also conducted with a sample of predominantly university students that participated in basketball on a non-professional level. Non-professional basketball, while still competitive, does include individuals who are typically more inhibited and less invested in winning when compared to professional athletes. This hindered the study’s ability to thoroughly assess certain performance metrics that are more prevalent in higher levels of competition, such as dives, loose balls recovered, and charges taken.
this did not indicate a lower level of hustle in individuals it could have indicated that individuals had less of a reason to exhibit hustle in this specific context.
Chapter 6: Discussion and Future Direction

Discussion

Researchers addressed the aims of the research and established a definition for hustle, determined it uniqueness from other constructs, and developed a scale to predict hustle. By defining hustle, it was established that hustle has three major elements: 1) consistent effort, 2) demonstrated physical effort and 3) effort that is comparatively higher than group normal effort. Individuals that demonstrated high levels of the hustle trait were identified for their propensity to exceed group norms in displayed physical effort on a consistent basis.

Although hustle was unable to differentiate itself as a wholly unique construct, it was recognized by several samples during the research. Research suggested that hustle may be used as an umbrella term for other constructs. Desire, determination, focus, effort, perseverance, tenacity, passion, and grit were identified as possibly synonymous. Although other constructs did touch on elements of comparative effort, none specifically explained effort from a physical or displayed perspective as hustle did which supported the hypothesis of hustle uniqueness.

The research expanded beyond observation with the development of a scale to measure hustle. This scale was intended to illuminate the theorized spare effort gap adapted from Kahneman (1973) and identify individuals that exhibited effort closer to their total available effort. The scale did not exhibit true validity in assessing individual hustle. However, the significant relationship between self-reported and peer-reported hustle suggested that individual perception of hustle is reliably reported across parties – although self-reported hustle is typically higher than peer-observed hustle. The scale’s failure to align
with previously used NBA composite metrics of hustle in the athletic domain indicated the need to address the composition and objective of the scale for the future.

It was also determined that certain metrics were representative of hustle and current definitions of performance based hustle should be expanded. Hustle metrics should include current elements of shots contested, deflections, loose balls recovered, and screen assists but should also incorporate blocks, offensive rebounds, and defensive rebounds. All metrics should also be measured at a per possession rate.

Mixed results on the relationship between hustle and success suggested that more exploration into the role of hustle in success was necessary. An absence of a relationship between hustle and individual success suggests that hustle might not be important on an individual level, yet other results noted that hustle might play a pivotal role for the success of the team. This suggested that hustle might have served as a more vital component in the team environment and should be emphasized in team sports more than individual athletics (such as wrestling, track and field, swimming, golf, etc.). Although it has perpetually been assumed that high levels of physical effort are important in physical athletic event, the emphasis of hustle as a key ingredient in success should be questioned depending on the domain.

Over the past decade, the domain of sports has seen an emergence of the use of analytics in understanding player value (Steinberg, 2015). These metrics assess and critique athletes solely on demonstrable statistics, but often lag in their ability to capture elements of individual traits. Hustle metrics have started to bridge that gap for the NBA (Reynolds, 2015; Concepcion, 2015; Rain, 2016). This research not only validated those metrics as a
valuable measure but also explored the methods of identifying hustle through other behaviors.

**Future Directions**

The previous research assumed that hustle was a trait shared by individuals who maximize their effort output and minimize effort reserved, or spare effort. Further research should seek ways and methods of manipulating hustle for performing individuals. A variety of informal resources exist that provide methods for increasing or influencing hustle on the field and in the office (Siu, nd; Curtis, 2013; Wallen, nd). While these approaches and advice columns have provided an informal foundation for influencing hustle, more scientific and rigorous methods should be explored such as mindset interventions, protocols for manipulating effort, methods of passion transference, and techniques for increasing motivation.

**Mindsets and Implicit theories**

Hustle could benefit from manipulation approaches deemed successful in manipulating mindset and implicit theories. Implicit theories are defined by Dweck, Chiu, and Hong (1995) as the “core assumptions about the malleability of personal qualities” and often vary inter-personally between entity mindsets and incremental mindsets (Yeager & Dweck, 2012, p. 303). Implicit theories and the manipulation of these theories have been tested in a variety of domains, most notably in learning environments dealing with intelligence and personality (Yeager & Dweck, 2012), but might show promise in the athletic domain as well.
Repeated research has shown that implicit theories can be changed and altered to influence more incremental mindsets (Aronson, Fried, and Good, 2002; Dweck, Chiu, & Hong, 1995; Yeager & Dweck, 2012). The predominant tools shown to be effective in influencing these incremental mindsets include education and feedback. By educating students on the malleability of the brain and instructing individuals on how certain traits can be developed over time, students have shown improvement in their academic behavior (Aronson, Fried, & Good, 2002; Blackwell, Trzesniewski, and Dweck, 2007), aggression and stress (Yeager, Trzesniewski, Tirri, Nokelainen, and Dweck, 2011), and resilience (Yeager & Dweck, 2012). Incremental theory interventions often include education about the malleability of a personal trait. If the trait of hustle can be influenced by an incremental theory approach like academic behavior or other personality traits, then it might be manipulated with similar techniques used in incremental theory. By leveraging the incremental techniques, future research could address the possibility of influencing more hustle in individuals.

**Changing Effort**

Previous research in the manipulation of effort should inspire future work in the manipulation of hustle. Research has shown that effort can be manipulated and affected by certain interventions that include deferred compensation (Adams & Heywood, 2011; Lazear, 1979), monitoring (and Frey, 1993), and name priming (Silvia, Jones, Kelly, Zibaie, 2011). Other techniques focused on providing a metabolic boost to effort in the form of caffeine intake have been explored but have failed to provide conclusive findings that caffeine can in
fact alter levels of subjective effort (Wardle, Treadway, & de Wit, 2012). These techniques should be employed in future approaches to manipulating hustle.

**Transference of Passion**

Several academics and entrepreneurs have related the construct of passion to success and effort. Chang (2001) posited that passion is the inspiration behind higher levels of hard work and noted that passion can be contagious. This element of contagion provided another means of understanding how hustle might be affected. By creating an environment of hustle and effort where individuals can be affected by group norms and social comparison, hustle might be manipulated in the direction of the group norm, which aligns with the previous definition of hustle hinging on displayed effort above the group mean. It is through this “monkey see, monkey do” concept of emotional mimicry that individuals could be influenced in their manifestation of hustle (Cardon, 2008, p. 81).

**Motivation**

Techniques that spur motivation might prove useful in enhancing individual hustle as well. Motivation is often discussed as an elemental part of athletic success and examinations have found a moderately strong positive relationship between the competencies of a coach and achievement motivation in student-athletes (Chiu, Mahat, Marzuki, & Hua, 2014). It is therefore assumed that future manipulations of hustle should also leverage credible and competent individuals in the influence of hustle.

**Techniques**

By using techniques that have shown results in altering mindset, levels of effort, passion, and motivation one might also be able to influence the presence and display of
individual hustle. These techniques should provide the foundational tenets of a successful approach in manipulating hustle but are by no means complete. However, methods of emphasizing the malleability of hustle, providing feedback describing the incremental nature of hustle, and conveying these messages from an individual with highly rated credibility in the field could prove useful in future hustle manipulation.
REFERENCES


McAuley, Duncan, Tammen, 1987


Appendix A

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Defining Hustle
Principal Investigators: Landon LaPorte
Faculty Sponsor (if applicable): Dr. Anne McLaughlin

What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you if you wish to have a copy. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

What is the purpose of this study?
The purpose of this study is to define and understand the trait of hustle in basketball players.

What will happen if you take part in the study?
If you agree to participate in this study, you will be asked to respond to a variety of survey questions concerning the topic of “hustle.” The survey will take approximately 10-20 minutes.

Risks
There are no risks with participating in this survey.

Benefits
There is no expected direct benefit to you as a study participant.

Confidentiality
The information in the study records will be kept confidential to the full extent allowed by law. Data will be stored securely by the principle investigator. No reference will be made in oral or written reports that could link you to the study. You will NOT be asked to write your
name or any other personal identifiers on any survey materials so that no one can match your
identity to the answers that you provide.

**Compensation**
You will not be compensated for your participation in the study.

**What if you have questions about this study?** If you have questions at any time about the
study or the procedures, you may contact the researchers, Landon LaPorte at
ldlaport@ncsu.edu or Anne McLaughlin at acmclaug@ncsu.edu.

**What if you have questions about your rights as a research participant?**
If you feel you have not been treated according to the descriptions in this form, or your rights
as a participant in research have been violated during the course of this project, you may
contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus
(919/515-4514) or faculty advisor, Dr. Anne McLaughlin at acmclaug@ncsu.edu.

**Consent To Participate**
“I have read and understand the above information. I have received a copy of this form. I
agree to participate in this study with the understanding that I may choose not to participate
or to stop participating at any time without penalty or loss of benefits to which I am
otherwise entitled.”
**: Yes - I will participate**
**: No - I chose not to participate**

What is the highest level at which you have coached basketball?
: Professional
: Div. 1 College
: Div. 2 College
: Div. 3 College
: Other College
: High School
: Non-school affiliated youth (AAU, Travel Teams, Recreation League, etc.)
: Other _______________
Please enter the number of years you have served as a coach (either head coach or assistant coach) of a basketball team:
- 0
- 1-5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- 31-35
- 36-40
- 40+

Are you male or female?
- Male
- Female
- I choose not to identify

Please rate your interest in professional basketball:
- Very disinterested
- Somewhat disinterested
- Neutral
- Somewhat interested
- Very interested
Please select your FAVORITE NBA basketball team:

- Atlanta Hawks
- Boston Celtics
- Brooklyn Nets
- Charlotte Bobcats
- Chicago Bulls
- Cleveland Cavaliers
- Dallas Mavericks
- Denver Nuggets
- Detroit Pistons
- Golden State Warriors
- Houston Rockets
- Indiana Pacers
- LA Clippers
- LA Lakers
- Memphis Grizzlies
- Miami Heat
- Milwaukee Bucks
- Minnesota Timberwolves
- New Orleans Pelicans
- New York Nets
- Oklahoma City Thunder
- Orlando Magic
- Philadelphia 76ers
- Phoenix Suns
- Portland Trail Blazers
- Sacramento Kings
- San Antonio Spurs
- Toronto Raptors
- Utah Jazz
- Washington Wizards
- I do not have a favorite team
Please select your LOCAL NBA basketball team:
- Atlanta Hawks
- Boston Celtics
- Brooklyn Nets
- Charlotte Bobcats
- Chicago Bulls
- Cleveland Cavaliers
- Dallas Mavericks
- Denver Nuggets
- Detroit Pistons
- Golden State Warriors
- Houston Rockets
- Indiana Pacers
- LA Clippers
- LA Lakers
- Memphis Grizzlies
- Miami Heat
- Milwaukee Bucks
- Minnesota Timberwolves
- New Orleans Pelicans
- New York Nets
- Oklahoma City Thunder
- Orlando Magic
- Philadelphia 76ers
- Phoenix Suns
- Portland Trail Blazers
- Sacramento Kings
- San Antonio Spurs
- Toronto Raptors
- Utah Jazz
- Washington Wizards
- I do not have a local team

Please enter your residential zip code:
Pick up to 3 players that you consider "hustle players":
- Giannis Antetokounmpo
- Elton Brand
- Dante Cunningham
- Evan Fournier
- Gerald Henderson
- Perry Jones
- Kevin Martin
- Kelly Olynyk
- Alexey Shved
- Evan Turner

Pick up to 3 players that you consider "hustle players":
- Ray Allen
- Andray Blatche
- Mike Conley
- Tyreke Evans
- Tim Hardaway Jr.
- Brandon Jennings
- Kevin Love
- Andrew Nicholson
- John Salmons
- Klay Thompson

Pick up to 3 players that you consider "hustle players":
- D.J. Augustin
- Alec Burks
- Glen Davis
- Pau Gasol
- George Hill
- Enes Kanter
- Jodie Meeks
- Paul Pierce
- Josh Smith
- Dion Waiters
Pick up to 3 players that you consider "hustle players":
- Kent Bazemore
- Omri Casspi
- Tim Duncan
- Danny Green
- Jarrett Jack
- Kawhi Leonard
- Marcus Morris
- Brian Roberts
- Mirza Teletovic
- Elliot Williams

Pick up to 3 players that you consider "hustle players":
- Carlos Boozer
- Jordan Crawford
- Raymond Felton
- Spencer Hawes
- Joe Johnson
- Ian Mahinmi
- Kyle O'Quinn
- Ramon Sessions
- Anthony Tolliver
- Tyler Zeller

Pick up to 3 players that you consider "hustle players":
- Harrison Barnes
- Jose Calderon
- DeMar DeRozan
- Paul George
- Dwight Howard
- Kosta Koufos
- Patrick Mills
- Phil Pressey
- Lance Stephenson
- C.J. Watson
Pick up to 3 players that you consider "hustle players":
- Trevor Ariza
- Aaron Brooks
- Samuel Dalembert
- Channing Frye
- Roy Hibbert
- DeAndre Jordan
- Ben McLemore
- Chandler Parsons
- Ishmael Smith
- Anderson Varejao

Pick up to 3 players that you consider "hustle players":
- Darrell Arthur
- Trey Burke
- Anthony Davis
- Diante Garrett
- J.J. Hickson
- Cory Joseph
- Josh McRoberts
- Patrick Patterson
- J.R. Smith
- Greivis Vasquez

Pick up to 3 players that you consider "hustle players":
- LaMarcus Aldridge
- Bismack Biyombo
- Darren Collison
- Monta Ellis
- Jeff Green
- Al Jefferson
- Shaun Livingston
- Timofey Mozgov
- Ricky Rubio
- Hollis Thompson
Pick up to 3 players that you consider "hustle players":
- Jose Barea
- Nick Calathes
- Luol Deng
- Alonzo Gee
- Kirk Hinrich
- Kyle Korver
- Mike Miller
- Miles Plumlee
- Marreese Speights
- John Wall

Please rank how much the following basketball statistics demonstrate a players "hustle" by order of importance by dragging the options to the order you desire (1 - Most Important, 2 - Second Most Important, etc.)

- Minutes Played
- Shooting Percentage
- Ability to get to the free throw line
- Offensive Rebounds
- Defensive Rebounds
- Assists
- Steals
- Blocks
- Turnovers
- Personal Fouls
- Points Scored

MOTIVATION (The reason one has for acting or behaving in a particular way): How important do you feel that MOTIVATION is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important
GRIT (Perseverance and passion for long-term goals): How important do you feel that GRIT is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

GROWTH MINDSET (a belief about one’s ability and power to change a personal characteristic or trait): How important do you feel that GROWTH MINDSET is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

PERSONALITY (individual differences in characteristic patterns of thinking, feeling and behaving): How important do you feel that PERSONALITY is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important
INTERNAL LOCUS OF CONTROL (the extent to which individuals believe that they can control events that affect them): How important do you feel that INTERNAL LOCUS OF CONTROL is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

EXTERNAL LOCUS OF CONTROL (the extent to which individuals believe that they have NO CONTROL over events that affect them): How important do you feel that EXTERNAL LOCUS OF CONTROL is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

INTELLIGENCE (a person's ability and capacity to acquire and apply knowledge and skills): How important do you feel that INTELLIGENCE is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

SELF-EFFICACY (the belief in one's capabilities to organize and execute the courses of action required to manage or succeed in a situation): How important do you feel that SELF-EFFICACY is in hustle?
- Very Unimportant
- Unimportant
- Neither Important nor Unimportant
- Important
- Very Important

Do you feel any other components or items demonstrate what "hustle" is in basketball? If so, please list them below:
If you wish to be contacted about future surveys regarding analysis in sports, please list your email:

Do you have comments or suggestions for how we can improve this survey? (Did you understand the survey? Should questions be added or eliminated?)
Appendix B

Player Questionnaire

Player Name: ___________________________  My Jersey Number: ______
Email: ________________________________  Gym: _________________________

Gender: □ Male  □ Female
Age: ______
Ethnicity: □ Asian  □ Black/African American  □ Hispanic/Latino  □ Native American
□ White/Caucasian  □ Prefer Not to Say  □ Other: _________________________

Number of YEARS playing basketball: ______  Hours per week playing basketball: ______  College GPA: ______/4.0

Highest Level of competitive basketball (Please select all that apply):
□ Recreational  □ HS Junior Varsity  □ HS Varsity  □ College Club  □ Collegiate Team  □ Professional

Basketball cognition (Please select all that apply):
□ Team starter  □ All-star  □ All-District  □ All-State  □ Other: _________________________

Indicate how representative each statement is of YOU by marking the circle (O).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not like me at all</th>
<th>Not much like me</th>
<th>Somewhat like me</th>
<th>Mostly like me</th>
<th>Very much like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoy contesting shots during my games.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. It is important for me to take charges during my games.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3. I am diligent (hardworking and careful).</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4. It is important for me to recover loose balls during my games.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5. Providing high effort is stimulating.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6. Working hard helps me maintain new skills.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7. I like playing with a higher level of effort than my peers.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>8. When I am competing, the demands I make upon myself are very high.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9. I am a hard worker.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10. It is important for me to get deflections during my games.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>11. I like working hard.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>12. Working hard helps me attain new skills.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>13. I put a lot of effort into competition.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>14. I continue to work hard until I reach my goal.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>15. It is important to me to put effort into my training and competition.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>16. I am a hustle player.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
Appendix C

Peer Questionnaire

Peer Jersey Number: ________________

<table>
<thead>
<tr>
<th>How well do you know this person?</th>
<th>Not at all</th>
<th>Familiar</th>
<th>Very Well</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many times have you played</td>
<td>0</td>
<td>1-3</td>
<td>4-6</td>
</tr>
<tr>
<td>with/against this person before?</td>
<td>(Circle one)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Indicate how representative each statement is of THE PLAYER by marking the circle ( O ).

<table>
<thead>
<tr>
<th>Statement</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This player enjoys contesting shots during his/her games.</td>
<td></td>
<td></td>
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<tr>
<td>2. It is important for this player to take charges during his/her games.</td>
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<tr>
<td>3. This player is diligent (hardworking and careful).</td>
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<tr>
<td>4. It is important for this player to recover loose balls during his/her games.</td>
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<tr>
<td>5. Providing high effort for this player is stimulating.</td>
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</tr>
<tr>
<td>6. Working hard helps this player maintain new skills.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. This player likes playing with a higher level of effort than his/her peers.</td>
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<td></td>
<td></td>
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<tr>
<td>8. When this player is competing, the demands he/she makes upon themselves are very high.</td>
<td></td>
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<td></td>
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<td>9. This player is a hard worker.</td>
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<td>12. Working hard helps this player attain new skills.</td>
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<tr>
<td>13. This player puts a lot of effort into competition.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>14. This player continues to work hard until he/she reaches his/her goal.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. It is important to this player to put effort into his/her training and competition.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. This player is a hustle player.</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
Appendix D

Game Play Rules

1) Regular games will be played to until one team scores 20 points.

2) Tournament or Intramural games will be played to a 20-minute duration.

3) All games will be played on half of a basketball court.

4) A defensive player must handle the ball prior to putting the ball in play from out-of-bounds or after a goal is scored (the ball must be “checked”). The offensive player receiving the ball following the “check” must pass the ball in to initiate play. The ball is "checked" at the top of the key following baskets, out of bounds plays and non-shooting fouls.

5) Shots completed within 20-feet from the basket (within the 3-point line) will be scored as 2 points.

6) Shots completed beyond 20-feet from the basket (outside of the 3-point line) will be scored as 3 points.

7) After a team scores a basket or point the defending team will be awarded possession of the ball.

8) Following defensive rebounds or a change of possession, the ball must be returned behind the three-point arc. The ball must touch the floor or a player, who has both feet touching behind this line prior to being able to legally convert a field goal attempt.

9) Players will call their own fouls and violations.