Learning Patterns Relationship to Leadership Development

Brett Vincent Morgan
Abstract

Although college faculty and administrators provide many types of leadership development opportunities for college students, there has been little research connecting leadership development in college with adult learning theory. This mixed method descriptive study examines the impact of learning patterns based on information processing preferences on the leadership development “events” experienced by college student leaders. 44 Junior and Senior college student leaders were administered the Learning Connections Inventory (Johnston, 1994) to identify their learning patterns. In addition, the students participated in an interview to assess key events they felt crucial to their leadership development. It was predicted that particular learning pattern combinations would significantly relate to the types of events found to be significant. MANOVAs were preformed to investigate a connection between learning patterns and the types of events students experienced. Results found a significant difference between the events participants chose as significant based on their learning pattern combinations. Specifically, individuals whose learning pattern combination was technical and confluent chose significantly different events in the Challenging Assignments category than individuals’ whose learning pattern combination was sequence, technical, or confluence. In addition, individuals’ whose learning processing pattern combination was sequence, precision, and confluence chose significantly different events in the Other Events category than those with the learning pattern combination of sequence or technical. Results also support differences between pattern combinations and a higher representation of dominant patterns of sequence and precision. The significance and implications of these findings are discussed.
MONTCLAIR STATE UNIVERSITY

Learning Patterns Relationship to Leadership Development

by

Brett Vincent Morgan

A Master's Thesis Submitted to the Faculty of
Montclair State University
In Partial Fulfillment of the Requirements
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College of Humanities and Social Sciences
Psychology Department

Thesis Sponsor: Dr. Valerie Sessa
Dr. Marietta Morrissey
Dean of College or School

Thesis Committee:
Dr. Kenneth Sumner
Dr. Jennifer Brägger

Department Chair

Dr. Peter Vietze
Learning Patterns Relationship to Leadership Development

A THESIS

Submitted in partial fulfillment of the requirements
For the degree of Master of Arts

By
BRETT VINCENT MORGAN
Montclair State University
Montclair, NJ
2012
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Learning Patterns Relationship To Leadership Development

Companies have devoted time and resources to develop employees’ leadership skills (Collins 2002; O’Leonard 2007). Higher education institutions have also devoted time and resources to developing leadership skills as they generally view leadership development as part of their responsibility of preparing students to be successful in the workforce and participate in society (Astin & Astin, 2000; Brubacher & Rudy, 1997; Dewey, 1938 as cited in Benson, Harkavy, & Puckett, 2007; Miller, 1997). This leads these institutions to provide both formal and informal leadership development programs including, curricular courses, co-curricular activities, and other opportunities and events that provide leadership development through experience (Dugan & Komives, 2007). These practices focus on leadership development as “one size fits all” process (Day, 2000; Kezar & Moriarty, 2000; Kolb, 1999; McCauley, Moxely, & Van Velsor, 1998). However, leadership development experts suggest that individual differences are important considerations in both research and practice (Avolio, 1999). And although there has been much research conducted on leadership development with both business leaders and college students (Day, 2000, Dugan & Komives, 2007), to date much of the research has failed to account for the impact of individual differences on leadership development.

One individual difference that may influence how individuals develop as leaders is the different ways that individuals learn (Hall, 1986; Hall & Mervis, 1995; Hill, 2003; Kaiser & DeVries, 2000; Lombardo & Eichinger, 1989; Lombardo & Eichinger, 2000; McCall, Lombardo, & Morrison, 1988; Morrison, White, & VanVelsor, 1992, Sternberg, Wagner, Williams, & Horvath, 1995). However, although, it is recognized in the learning
literature that different people learn differently (Deboth & Dominowski, 1978; Ackerman, 1987; Horn, Collier, Oxford, Bond, & Dansereau, 1998; Bliss-Moreau, Barrett, & Wright, 2000), to date, leadership development research and practice has not taken these differences into account.

**Purpose**

The purpose of this study is to investigate how differences in individual learning processes impact leadership development. Specifically, using Johnston’s (1994) Interactive Learning Model ILM theory, this study will examine the impact individual processing patterns have on the type of events college students find significant to their leadership development. This paper will start by discussing the literature on leadership development in college students, it will then progress to the learning and leadership development literature, and finally it will suggest how the research on individual differences in learning and learning patterns might relate to the development of leaders in college students.

**Leadership Development in College Students**

With so many organizations spending large amounts on leadership development (Collins 2002; O’Leonard 2007), it is no wonder that Austin (1997) found leadership development was frequently mentioned as a goal of college educators. There is a need for institutions of higher education to develop leadership in their students to prepare them to contribute to society (Astin & Astin, 2000; Polleys, 2002). Many higher educational institutions have statements mentioning how they help students gain the leadership skills, which make them successful contributing members of society (Boatman, 1999).
However, according to Casner-Lotto & Barrington, (2006) college students are not graduating with the leadership skills organizations desire. The part of the Council for the Advancement of Standards in Higher Education Standards Contextual Statement that discusses student leadership programs, states colleges and universities need to produce more and better-qualified leaders (Miller, 1997). Astin & Astin (2000) also contend that colleges and universities need to reexamine how they develop student leaders. This has caused colleges and universities to examine the leadership opportunities offered to students and create leadership courses and programs that help the students develop as leaders and provide them with formal knowledge of leadership concepts (Sessa, et al., 2009; Boatman, 1999). For example, both the University of South Florida and Montclair State University have created Leadership Minors, as well as, Living Learning Communities based on leadership; these programs are cropping up in many colleges throughout the United States.

There are many theories that define leadership in terms of relationships fostering transformation and empowerment (Bass, 1985; Burns, 1978; Drath, 2001; Gardner, 1990; Komives, 1998; Rost, 1991). For example, Komives (1998) illustrates the idea of relational leadership. She contends that leadership has relationships as a focal point of the leadership process. If as Komives (2006) claims, relationships are a focal point of the leadership process, this suggests that leadership can also be developed outside of a formal classroom environment if those relationships exist. Many colleges and universities provide informal leadership training and leadership opportunities as well as formal classroom instruction (Dugan & Komives, 2007). Examples of formal leadership
programs include a job within the university or a leadership course, or a leadership experience that involves reflecting upon the experience and applying leadership theory.

Pascarella and Terenzini, (2005) found that students’ leadership skills can and do increase during their college years. Student involvement in co-curricular activities positively predicts leadership development (Antonio, 2001; Dugan, 2006; Kezar & Moriarty, 2000; Komives, Owen, Longerbeam, Mainella & Osteen, 2005; Sessa et al., 2012; Smart, Ethington, Riggs, & Thompson, 2002). A positive relationship has also been found between formal collegiate leadership programs and leadership development (Cress, Astin, Zimmerman-Oster & Burkhardt, 2001; Dugan, 2006; Dugan & Komives, 2010, Kezar & Moriarty, 2000; Whitt, 1994).

While research has examined leadership development in college students from a macroscopic perspective (Antonio, 2001; Dugan, 2006; Kezar & Moriarty, 2000; Komives, Owen, Longerbeam, Mainella & Osteen, 2005; Sessa et al., 2012; Smart, Ethington, Riggs, & Thompson, 2002), with few exceptions, it has not yet provided insight on how individual differences, such as individual learning processes influence college student leadership development.

Learning and Leadership Development

Learning has been found to be a key component to leadership development (Kaiser & DeVries, 2000; Lombardo & Eichinger, 1989; Lombardo & Eichinger, 2000; McCall, Lombardo, & Morrison, 1988; Morrison, White, & VanVelsor, 1992; Sternberg & Horvath, 2009). Kaiser and DeVries (2000) reviewed the various techniques used to develop leadership through leadership training. Although the techniques varied greatly, learning was a central component to each. The authors encouraged the use of learning
theories when linking content to methods and concluded that leadership development is best considered part of the life-long learning process.

Research in adult leadership development supports this idea that leadership development is part of a life long learning process. Learning from powerful on the job experiences have been shown to develop leadership in executives (McCall, Lombardo, & Morrison, 1988; Morrison, White, & VanVelsor, 1992). Military leadership development also emphasizes learning from experience (Sternberg & Horvath, 2009). McCall and colleagues (1988) found executives claimed they developed a great deal as leaders by learning how to deal with on the job challenges and experiences. Responding to new situations by changing ways of thinking and learning new skills were found to be one of the primary determinants of executive success (Lombardo & Eichinger, 1989; Lombardo & Eichinger, 2000).

However, perhaps the most important indication that learning is instrumental in leadership development is that successful executives exhibited similar and strong patterns of learning from experiences (Douglas, 2003; Lindsay, Holmes, & McCall, 1991; McCall et al. 1998). Lindsay and colleagues (1991) found these experiences included challenging assignments, hardship events, events dealing with others, and other events. Challenging Assignments are specific assignments the individuals found challenging. Hardship events have three characteristics: (a) Individual’s accepted appropriate personal responsibility for the mess they were in; (b) during the worst of it, they experienced a strong sense of aloneness or lack of control over events; and (c) the situation forced them to confront themselves. Events dealing with others were events where another person or persons
were the central focus of the event. Finally, other events were events, which did not seem to fit into the other categories (Lindsay, Holmes, and McCall, 1991).

In addition, the executives who did not develop patterns of learning from experiences were ultimately unsuccessful (McCall et al. 1988). McCall and Lombardo (1983) found that locking into a particular way of thinking and blocking out new learning was cited as a key reason for failing executives’ lack of success. While their research shows that developing individual learning patterns is important in leadership development, it does not tell us how the individual differences in their learning affected how leaders developed leadership.

**Individual Differences in Learning**

“Learning, that is, the process of learning, is a highly personal process whereby individuals use their informed, engaged, and reflective effort to develop their abilities to know, do, and feel.” (Johnston, 1996b, p.10). The task force for the National Association of Secondary School Principals (Keefe and Languis (1983) as cited in Keefe and Ferrell (1990)), defined learning style as: “the composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment. It is demonstrated in that pattern of behavior and performance by which a person approaches educational experiences” (Keefe & Ferrell, 1990, p. 59).

Snow and Jackson (1992), assert that all learning involves some mixture of cognition, conation, and affectation. Together, these three factors are considered the “Trilogy of the Mind” (Johnston, 1994). The idea of this trilogy has been found to date back as far as 1750 (Johnston, 1998). Though it has fallen in and out of the spotlight in
recent research, this trilogy concept exerts a powerful influence in current psychological thought (Hilgard, 1980). For example, a study by Philip (1936) examined participants as they worked to solve puzzles after which the participants were interviewed. The subjects' reflections were grouped into the three categories of cognitive, conative, and affective. Other studies have used similar categories of responses in measuring and assessing data (Johnston, 1996b).

The first element of the trilogy, cognition, is defined as an aptitude and contains intelligence, memory, and abstraction levels. Conation is described as the behavior of learning. It is comprised of the natural skills, pace, engaged energy, and autonomy associated with learning. Finally affectation is stated as the sense of self. This encompasses an individual's range of feelings, values, and sense of self (Johnston, 1994; Johnston, 1995). The components of the Trilogy of the Mind are interconnected and this interconnection creates patterns, which interact within a learner.

Where the three components of conation, affectation, and cognition overlap is the key to understanding how individuals learn (Johnston, 1994; Johnston, 1995), and is the basis of the Interactive Learning Model (ILM) (Johnston, 1994). The interaction between the three components creates learning schemas or learning patterns (Buchanan, 2005; Calleja, 1998; Calleja & Borg, 2006; Dawkins, 2008; Freese, 1999; Hayes, 1996; Henry, 2003; Johnston 1994; 1996a; 1996b; 1997; 2002; 2004; 2005; 2006; 2007; Johnston & Johnston, 1997; Kottkamp, 2002; 2006; Kottkamp & Silverberg, 1999; 2006; Maher & Stolnick, 2010; Marcellino, 2003; McSweeney, 2005; Osterman & Kottkamp, 2004; Pearle, 2001). In the ILM the interaction between the three components of cognition, conation, and affectation creates learning schemas or learning patterns (See Figure 1).
1. I Think
2. I Take Action
3. I Have Feelings

**Figure 1. Illustration of the Interactive Learning Model (Johnston, 2010)**

_Schemas are... “a pattern imposed on complex reality or experience to assist in explaining it, mediate perception, or guide response.” (The American Heritage Stedman's Medical Dictionary, 2001). Schemas help individuals organize and use the information they take in. Learning schemas are patterns of behavior, which are formed through time, just like other schemas. These patterns form based on “natural tendencies” and interactively immerse the learner in reflecting, performing, and processing. According to Johnston’s (1996b) review of the literature there are four learning patterns. These patterns_
include: “Sequence and organization (sequence), specificity and precision (precision), technical performance and reasoning (technical), and confluence and intuition (confluence)” (Johnston, 1996b, p. 41).

The sequence pattern is the one that seeks to organize and plan, complete work step-by-step, and work carefully through from start to finish without distractions. The precision pattern seeks detailed information, allows specific accurate answers, and causes an individual to want to know things for certain. The technical pattern seeks to get things done, is naturally hands on, likes to figure out how things work, and likes to dive in and work alone. Finally, the confluence pattern seeks unique ways to complete tasks, avoids taking the conventional approach, takes risks, improvises, uses imaginative approaches, and tries again after failures. Though everyone uses each of these four patterns to some degree, the amount they use them varies (Johnston, 1994; 1996; 1998; Maher & Slotnick, 2010).

Each individual has different patterns that are dominant. In other words, the pattern (or patterns) that an individual primarily uses depends on which pattern (or patterns) are the dominant processing ones. For example, one person may be dominant in sequence and precision. In that case he/she will primarily use those patterns because they come naturally to him/her. Whereas, For example, someone who uses the sequence pattern primarily will naturally structure and organize a task. An individual who is dominant in this area thinks about breaking tasks down into steps, feel empowered with consistency, makes lists, and ask to review directions.

Individuals can also have patterns that they avoid using. The pattern, or patterns, one avoids are usually one(s) the individual that don’t come naturally to them, that they
need to make a significant conscious effort to use, and those patterns, which, for that person, takes a great deal of energy to use. A person who avoids using sequence as a learning pattern often needs to make a conscious effort to structure and organize a task, such as a paper. This individual may think they don’t need to go step by step, feel they scattered, avoid directions, and ask why they have to follow a prescribed order. (Johnston, 1994; 1996a; 1996b; 1998; Maher & Slotnick, 2010). See Tables 1-4 for a breakdown of how individuals think, feel, do, and say based on their dominant pattern. See Table 5-8 for a breakdown of how individuals think feel, do, and say based on patterns they avoid.

Table 1: If Sequence Is Dominant

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>I organize information</td>
<td>I make lists</td>
<td>I thrive on consistency and dependability</td>
<td>Could I see an example?</td>
</tr>
<tr>
<td>I mentally categorize data</td>
<td>I organize</td>
<td>I need things to be tidy and organized</td>
<td>I need more time to double-check my work</td>
</tr>
<tr>
<td>I break tasks down into steps</td>
<td>I plan first, then act</td>
<td>I feel frustrated when the game plan keeps changing</td>
<td>Could we review those directions?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I feel frustrated when I’m rushed</td>
<td>A place for everything and everything in its place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>What are my priorities?</td>
</tr>
</tbody>
</table>
Table 2: If Precision Is Dominant

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think in information.</td>
<td>I challenge statements and ideas that I doubt.</td>
<td>I thrive on knowledge.</td>
<td>I need more information.</td>
</tr>
<tr>
<td>I ask lots of questions.</td>
<td>I prove I am right.</td>
<td>I feel good when I am correct.</td>
<td>Let me write up the answer to that.</td>
</tr>
<tr>
<td>I leave no piece of information unread.</td>
<td>I document everything.</td>
<td>I feel frustrated when incorrect information is accepted as valid.</td>
<td>My notes read differently. What I have is...</td>
</tr>
<tr>
<td>I think knowing facts means I am smart.</td>
<td>I write things down.</td>
<td>I feel frustrated when people do not share their information.</td>
<td>Wanna play trivia?</td>
</tr>
<tr>
<td></td>
<td>I write long messages.</td>
<td>I hate being &quot;out of the know.&quot;</td>
<td>I'm currently reading three different books.</td>
</tr>
</tbody>
</table>

(Johnston 2010) *Used with Permission.*

Table 3: If Technical Reasoning Is Dominant

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>I seek concrete relevance – what does this mean in the real world?</td>
<td>I get my hands on things.</td>
<td>I enjoy knowing how things work.</td>
<td>I can do it myself.</td>
</tr>
<tr>
<td></td>
<td>I tinker.</td>
<td>I feel good that I am self sufficient.</td>
<td>Let me show you how...</td>
</tr>
<tr>
<td></td>
<td>I solve the problem.</td>
<td>I feel frustrated when the task has no real world relevance.</td>
<td>I don’t want to read a book about it, I want to do it.</td>
</tr>
<tr>
<td></td>
<td>I do!</td>
<td>I enjoy knowing things, but I do not feel the need to share that knowledge.</td>
<td>How will I ever use this in the real world?</td>
</tr>
<tr>
<td></td>
<td>I figure things out.</td>
<td></td>
<td>How can I fix this?</td>
</tr>
<tr>
<td></td>
<td>I work in my head and then with my hands.</td>
<td></td>
<td>I could use a little space.</td>
</tr>
</tbody>
</table>

(Johnston 2010) *Used with Permission.*
Table 4: If Confluence Is Dominant

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>I read between the lines.</td>
<td>I take risks.</td>
<td>I am not afraid to fail.</td>
<td>What do you mean, “that’s the way we’ve always done it”?!!</td>
</tr>
<tr>
<td>I think outside the box.</td>
<td>I might start things and not finish them.</td>
<td>I enjoy improvisation.</td>
<td>The rules don’t apply to me.</td>
</tr>
<tr>
<td>I brainstorm.</td>
<td>I will start a task first – then ask for directions.</td>
<td>I feel frustrated by people who are not open to new ideas.</td>
<td>Let me tell you about....</td>
</tr>
<tr>
<td>I connect things that are seemingly unrelated.</td>
<td></td>
<td>I feel frustrated by repeating a task over and over.</td>
<td>I have an idea.......</td>
</tr>
<tr>
<td>(Johnston 2010) Used with Permission.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: If You Avoid Sequence

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>These directions make no sense!</td>
<td>Avoid direction; avoid practice</td>
<td>Jumbled</td>
<td>Do I have to do it again?</td>
</tr>
<tr>
<td>I did this before.</td>
<td>Ignore table of contents, indexes, and syllabi</td>
<td>Scattered</td>
<td>Why do I have to follow directions?</td>
</tr>
<tr>
<td>Why repeat it?</td>
<td>Leave the task incomplete</td>
<td>Out of synch</td>
<td>Does it matter what we do first?</td>
</tr>
<tr>
<td>Why can’t I just jump in?</td>
<td></td>
<td>Untethered</td>
<td>Has anybody seen my keys? They’re not where they’re supposed to be.</td>
</tr>
<tr>
<td>(Johnston 2010) Used with Permission.</td>
<td></td>
<td>Unfettered</td>
<td></td>
</tr>
<tr>
<td>Unanchored</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 6: If You Avoid Precision

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do I have to read all of this?</td>
<td>Don't have specific answers.</td>
<td>Overwhelmed when confronted with details.</td>
<td>Don't expect me to know names and dates!</td>
</tr>
<tr>
<td>How am I going to remember all of this?</td>
<td>Avoid debates.</td>
<td>Fearful of looking stupid.</td>
<td>Stop asking me so many questions!</td>
</tr>
<tr>
<td>Who cares about all this ‘stuff’?</td>
<td>Skim instead of read details.</td>
<td>Angry at not having the ‘one right answer’.</td>
<td>Does it matter?</td>
</tr>
<tr>
<td></td>
<td>Take few if any notes.</td>
<td></td>
<td>I’m not stupid!</td>
</tr>
</tbody>
</table>

*(Johnston 2010) Used with Permission.*

### Table 7: If You Avoid Technical Reasoning

<table>
<thead>
<tr>
<th>How you think</th>
<th>How you do things</th>
<th>How you feel</th>
<th>What you might say</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why should I care how this works?</td>
<td>Avoid using tools or instruments.</td>
<td>Inept</td>
<td>If it is broken, throw it away!</td>
</tr>
<tr>
<td>Somebody has to help me figure this out!</td>
<td>Talk about it instead of doing it.</td>
<td>Fearful of breaking the object, tool or instrument.</td>
<td>I’m an educated person; I should be able to do this!</td>
</tr>
<tr>
<td>Why do I have to make something; why can’t I just talk or write about it?</td>
<td>Rely on the directions to lead me to the solution.</td>
<td>Uncomfortable with tools; very comfortable with my words and thoughts.</td>
<td>I don’t care how it runs; I just want it to run!</td>
</tr>
</tbody>
</table>

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In addition to a person’s dominant pattern and avoidant pattern(s), there are also patterns that an individual uses as bridge patterns. These bridge patterns fall between the
dominant and avoided patterns and are often used as needed by the learner. They take less conscious effort to use them than the patterns individuals avoid, but do not come as easily as the dominant patterns. For example, a person who’s bridge pattern is technical and dominate patterns are sequence and precision may take a good amount of time planning and getting the specific information needed and then have to remind him/herself to get started on the task. The planning and the gathering of specific information for this person demonstrate the dominant patterns of sequence and precision, while the reminder to get started shows the conscious effort to engage the technical pattern (Johnston, 1994, 1996b, 1998; Maher & Slotnick, 2010).

However, the key to the ILM (Johnston, 1994) is that individuals use these patterns in combination. The ILM is based on the idea that learning is not a strategic approach, personality type, or a preference, but rather an integrative process involving the interaction of four patterns. The four patterns are not used in isolation; the combination of the use of patterns determines how an individual learns. Therefore, individuals who have a dominant technical pattern learns differently than an individual who has dominant technical and confluent patterns (Johnston, 1994; 1996a; 1996b; 1998; Maher & Slotnick, 2010).

There are many learning models being researched or used in practice, and researchers have found serious flaws in almost all of them (Maher & Stolnick, 2010). In three different independent reviews of learning styles (Bedford, 2004, Cassidy, 2004; Coffield, Moseley, & Ecclestone, 2004) major problems were found ranging from psychometric issues with reliability and validity to ambiguity and a lack of a comprehensive learning model. However, Maher and Stolnick (2010) examined the ILM
Learning Patterns and Leadership Development

How do learning patterns influence leadership development? There are several experiential learning theories which postulate that an individual learns by facing a challenging situation or experience and then by reflecting on its outcomes (Dewey, 1938; Rogers, 1969; Knowles, 1975; Kolb, 1984; Marsick & Watkins, 1990). In addition, Ausubel’s (1968) cognitive learning theory and the motivation based skills acquisition theory by Kanfer and Ackerman (1989) support the concept that individuals learn and develop skills from experiences. The challenge level of the experience has been found to predict the level of learning from that experience (McCauley, Ruderman, Ohlott, & Morrow, 1994). Research shows that experiences and events can help individuals develop leadership skills (Douglas, 2003, Lindsay, Homes, and McCall, 1991) by providing a significant opportunity from which to learn.

Although there is a great deal of research on learning, individual processing patterns, learning in terms of leadership development, there are no studies which examine the link between information processing patterns and leadership development. Therefore, if, as research suggests, (a) learning is a key part of leadership development; (b) individual processing patterns influence what individuals learn; (c) people use processing patterns at different levels; and (d) learning occurs when individuals deal with challenges or experiences and reflect on them, then which challenges or experiences people choose as significant to reflect on, should be determined by their individual processing patterns.

The major research question of this study is then the following:
Research Question: Do the individual’s learning pattern combinations impact the type of events that person finds significant to their development as a leader?

This study poses a research question and not a hypothesis because there are no studies, which connect information processing patterns and leadership development events. It seems likely that information processing patterns do influence the types of events individuals chose as significant in their leadership development. Therefore this study asks, do people who take in and examine information differently, find different events significant learning experiences? It seems feasible that two individuals who process information differently and are exposed to the same event may not both find it significant to their leadership development because they process the event differently. For example, an individual who has a learning pattern combination with dominant patterns in technical and confluence may find an event which involves a great deal of creativity and opportunities to take something apart and put it back together more significant because individuals with those dominant patterns enjoy learn best by doing those things. Alternatively, would someone who has a combination with sequence as a dominant pattern find having a mentor significant because individuals with sequence as a dominant pattern combination like to have clear guidelines and directions?

Methods

Participants

The researchers approached senior level Student Affairs Administrators at 4 colleges and universities surrounding a large metropolitan area in the mid Atlantic region who were in charge of leadership development at their institution. These particular
institutions were approached because they differed on a variety of characteristics such as size, Carnegie classification, and public/private status, enrollment profile, etc. See Table 9 for a description of the 4 institutions.

<table>
<thead>
<tr>
<th>Table 9.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carnegie Classifications</strong></td>
</tr>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Control</td>
</tr>
<tr>
<td>Student Population</td>
</tr>
<tr>
<td>Enrollment Profile</td>
</tr>
<tr>
<td>Size &amp; Setting</td>
</tr>
<tr>
<td>Basic</td>
</tr>
</tbody>
</table>

Note: See Appendix B for definitions

Administrators at five colleges or universities were approached and four of those administrators were interested in the study and agreed to participate. The administrators each sent out emails to 30 to 35 traditionally aged juniors or seniors, who they felt were the top student leaders on their campus, to ask if they would be interested in participating in the research study. The qualifications for being the top junior and senior leaders on their campus were left up to the discretion of the administrator. Approximately 130 students were contacted in total. If the students indicated interest, the administrators gave the researchers the student’s email address. Of those 130 students originally contacted, 72
(55%) students responded that they were interested. Of those, two were ineligible, because they were sophomores. Researchers were able to survey and schedule interviews with 44 students for a response rate of 35%. Of these students, 66% were female; 68% identified themselves as white, 18% Asian, 7% Black, and 7% as Latino/Hispanic. See Table 10 for the demographic breakdown of the participants.

Table 10.

<table>
<thead>
<tr>
<th>Participant Demographics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
</tr>
<tr>
<td>Seniors</td>
</tr>
<tr>
<td>Juniors</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
</tr>
<tr>
<td>Asian</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

**Design and Procedure**

A concurrent mixed method descriptive design was used to examine the relationship between the independent variable of college students processing pattern combinations and the dependent variable of events they identified as significant to their leadership development and. In this study, the independent variable data was measured using the Learning Connections Inventory (Johnston, 1994), which assess individual’s learning pattern combinations. The dependent variable data was collected using interview methodology and content coded. The independent variables and dependent variables were compared using MANOVA to examine the variances in events chosen by individuals with different learning pattern combinations.
The researchers emailed the participants and asked them to sign up for an interview time and to complete two online instruments: an instrument asking them for their demographics and the Learning Connections Inventory (LCI) (Johnston, 1994). The LCI measured participants' primary, avoidant, and bridge learning patterns. Participants were also given instructions for preparing for the study:

To help you get ready for the interview we want to give you time to think about the following questions:

When you think back on your collegiate leadership experiences, certain events or stories probably come to mind -- things that lead you to change or affirm the way you lead. Please write down some notes for yourself and identify at least three "key events" from your years in college which helped shape you into the leader you are today. What happened and what did you learn from those experiences (the good and the bad)?

A reminder email was sent to the students prior to their interview. This email confirmed the interview time and place. If the students had not filled out the on-line instruments, they were prompted to do so. This email also re-prompted the students to think about the main interview questions.

**Independent Variables: The Learning Connections Inventory**

The Students' learning patterns were measured using the Learning Connections Inventory (LCI). The LCI is a learning inventory based on the ILM developed by Johnston (1994, 1996b, 1998). It is an empirical inventory designed to provide a profile of how the four learning patterns interact. It is a self-report inventory comprised of two
parts. The first part contains 28 descriptive sentences, which the participant rates on a five point Likert-type continuum. The second section of the inventory contains 3 easy questions designed to parallel the information from the first section to assist in interpreting feedback and provide validation. The web version provides a validated scored profile with a brief explanation of the results (Johnston & Dainton, 2004; Maher & Stolnick, 2010).

The LCI looks at these 4 patterns and determines the level at which an individual "uses" the pattern. There are two major steps to interpreting the results of the LCI. First, the inventory rates the individuals usage of these patterns from 7 to 35 using the 28 likert-type scores from the first part of the inventory. The scale starts at seven because individuals use every pattern to at least some degree. The LCI examines "to what degree" a pattern is used rather than "if" a pattern is used, which is why it is termed an "inventory" and not a "test." The rating scale is also broken down into three different categories using ranges, which give an overall indication of the usage level of the pattern. Usually, when referring to individual’s scores on the learning patterns, one refers to the categories rather than the numbers. These categories with their associated ranges are (a) avoid, which ranges from 7 to 17; (b) use as needed, which ranges from 18 to 25; (c) use first, which ranges from 26 to 35.

The second section of the inventory, the essay question answers, is used to gain further insight into an individual’s use of the learning patterns. This is done by examining the answers to the essay questions for key words or phrases linked to the four patterns. This can (a) confirm a person’s level of a pattern; (b) help determine into which category a score close to or on the line (16-18 or 27-29) should fall; (c) dispute the level indicated
in first section of the inventory. If the second section disputes the first the individual needs to retake the inventory to get an accurate assessment.

Since its creation there have been numerous studies in over 11 different countries, which tested the reliability and validity of the LCI’s ability to predict learning patterns. Early studies, in 11 different countries using 4787 participants (Johnston & Danton, 2004), of the reliability and validity of the LCI “strongly support the factor structure identified in earlier pilot studies” (Johnston & Dainton, 2004, p. 11). Two test-retest studies using groups of 242 and 803 were conducted and showed a significant of <.01 on a scale-by-scale basis (Maher & Stolnick, 2010). A study of 20 elementary, middle, and high school students established content validity. Predictive validity was established in a different study of teachers of various age groups as well (Johnston & Dainton, 2004).

In the past 11 years the LCI has been used both business comities as well as educational institutions at over 19 national and international sites. These studies include over 15,000 students and 7,000 professionals. In addition one of these was a revalidation study using all of the incoming freshmen, starting in 2006, of a northeastern university. (Addy, 1996; Borg & Callega, 2006; Calleja, 1998; Campbell, 2005; Johnston, 2006; Silverberg & Kottkamp, 2006; Maher, 2005a; 2005b; Maher & Boyer, 2003; Marcellino, 2003; Osterman & Kottkamp, 2004; Silverberg, 2002).

**Dependent Variables: Significant Events**

Two members of the research team were present for each 30-45 minute interview. One member served as the primary interviewer while the second ran the audio equipment, listened, and asked prompts as necessary. The reason for the study was explained to the participant and the consent form was signed. An audio digital recorder was turned on.
Then, the interview began. We tailored a standard interview protocol developed by the Center for Creative Leadership for use with college student leaders. The students were asked the following, “When you think back over your time as an undergraduate student, certain events or episodes probably stand out in your mind—things that led to lasting change in you as a leader. Let’s start with the first key event that made a difference in you as a leader. What happened? As participants described their experiences, the interviewer and the second member posed follow-up prompts (such as “please tell me more about that?” or “Can you describe that in more detail?” or “What was important about this event?”) to elicit sufficient detail from the participant. Once they fully described the event, they were asked, “What did you learn from this event (for better or for worse)? This was repeated until the participant had no more lessons to add.

The participants were asked for two more events and lessons. In the event that they had time and additional events, some students spoke about a 4th and in some instances a 5th event and the lessons learned from the event.

After the interview was over, the research team transcribed the interviews from the audio files.

**Coding of the Interview.** Key Events identified by the students were individually coded into the categories similar to those developed by Douglas (2003) and Lindsay et al. (1991). See Appendix 1 for the categories and their definitions.

**Significant Events.** There were approximately 160 Events from the 45 participants. These were coded by two members of the research team using the following steps. First, the two members discussed what constituted a Challenging Assignment, a Hardship, Events Dealing with Other People, and a Miscellaneous Event. The team then
used approximately 20 randomly chosen events to help clarify their understanding of the event categories. After which, they separately coded the Events into one of the four macro categories of Challenging Assignments, Hardships, Events Dealing with Other People, and Miscellaneous and compared their scores. To determine reliability, Kappa scores were calculated (Fleiss, 1981). (Kappas > .70). Finally, discrepancies were discussed and resolved with consensus coding.

After the coding was complete a multivariate analysis of variance (MANOVA) was used to determine if the independent variables (learning pattern combinations) influenced the dependent variables (the events students found significant). There was one independent variable with a number of categories (learning pattern combinations) and multiple dependent variables (frequency of different significant events chosen).

Since individuals do not use each of the patterns in isolation, but rather in combination (Johnston, 1996), the independent variables were the individual’s pattern combinations. For example, an individual who has a dominant sequence, is different from an individual who has dominant precision and sequence patterns. The participant’s dominant patterns were only counted once, in his/her pattern combination. This means if an individual only had one dominant pattern, for example the sequence pattern, then sequence was considered his/her pattern combination. If an individual had dominant sequence and precision patterns, that individual’s combination was sequence and precision, and was not included in the sequence pattern combination or the precision pattern combination. The various learning pattern combinations were the independent variable categories.
The dependent variables were being measured quantitatively. The frequencies of Challenging Assignments, Hardships, Events Dealing with People, or Other Events were totaled individually. See table 7. Since this study wanted to generalize its findings to a larger population and had a categorical independent variable and multiple quantitative dependent variables, MANOVA was the best statistical method of measurement.

**Results**

**Learning Pattern Combinations**

The results of the LCI Inventory revealed that the participants used sequence and precision patterns predominantly. In addition, the participants used technical and confluence patterns as they needed them. It also shows the participants, as a whole, did not avoid using any patterns.

Individually, over 90% of the participants had sequence, precision, and confluence patterns at either the Use First or Use as Needed levels. Only 75% of the participants had technical patterns at the Use First or Use as Needed levels. Less than 40% of the participants had any scores at the Avoid level. The majority of Avoid scores were in the technical pattern area, which had 11 individuals who avoided using this pattern. The other three patterns had a total of six individuals scoring at the Avoid level. See Table 11 for more details.

Analysis of the pattern combination shows 75% of the participants were dynamic learners, meaning they had one or two dominant patterns. 18% of the learners were considered strong willed learners, meaning they had three dominant patterns. Finally, two
percent of the participants were bridge learners, meaning they used all of their patterns at the same level.

Table 11.

<table>
<thead>
<tr>
<th>Category</th>
<th>Use First</th>
<th>Use As Needed</th>
<th>Avoid</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Sequence</td>
<td>22</td>
<td>50%</td>
<td>20</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Precision</td>
<td>24</td>
<td>55%</td>
<td>19</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Technical</td>
<td>12</td>
<td>27%</td>
<td>21</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>Confluence</td>
<td>12</td>
<td>27%</td>
<td>29</td>
<td>66%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>89</td>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Of the participants who only scored at the Use First level for one learning pattern, sequence was most represented with 18% of the sample using this as a “Use First” learning pattern. Of all the participants, the highest combination represented was sequence and precision, which had 25% of the participants scoring at the Use First level for only sequence and precision together. Additionally, another 16% of the sample scored at the Use First level for sequence, precision, and either technical or confluence. Finally, the third highest combination pattern was technical and confluent, which represented 11% of the participants. See Table 12 for a complete breakdown of the pattern combinations.

Key Events

The 44 participants identified 145 events as significant to their leadership development. 93% of participants identified events in the Challenging Assignments macro category, 18% identified events in the Hardships macro category, 66% identified events in the Dealing with Other People macro category, and 50% identified events in the
Table 12.

**Participant Pattern Combinations at Use First Level**

<table>
<thead>
<tr>
<th>Combination</th>
<th>n=44</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence</td>
<td>8</td>
<td>18%</td>
</tr>
<tr>
<td>Precision</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td>Technical</td>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>Confluence</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Sequence and Precision</td>
<td>11</td>
<td>25%</td>
</tr>
<tr>
<td>Sequence and Technical</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Precision and Confluence</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Technical and Confluence</td>
<td>5</td>
<td>11%</td>
</tr>
<tr>
<td>Sequence, Precision, and Technical</td>
<td>4</td>
<td>9%</td>
</tr>
<tr>
<td>Sequence, precision, and Confluence</td>
<td>3</td>
<td>7%</td>
</tr>
<tr>
<td>Precision, Technical, and Confluence</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Sequence, Precision, Technical, and Confluence</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>

Other Events macro category. See Table 13 for the breakdown of the number of people who identified events in each macro category.

Table 13.

**Breakdown of Key Events Identified by Participants**

<table>
<thead>
<tr>
<th>Event</th>
<th>n=44</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macro categories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Challenging Assignments</td>
<td>41</td>
<td>93%</td>
</tr>
<tr>
<td>Total Hardships</td>
<td>8</td>
<td>18%</td>
</tr>
<tr>
<td>Total Events Dealing with Other People</td>
<td>29</td>
<td>66%</td>
</tr>
<tr>
<td>Total Other Events</td>
<td>22</td>
<td>50%</td>
</tr>
</tbody>
</table>

**MANOVA Analysis**

A between-subjects multivariate analysis of variances (MANOVA) was performed on three dependent variables: challenging assignments, events dealing with people, and other events. Independent variables were the individuals' learning pattern
combinations (sequence, technical, confluent, sequence + precision, technical +
confluence, sequence + precision + technical, and sequence + precision + confluence).

SPSS*MANOVA was used for the analyses with the sequential adjustment for
nonorthogonality. Order of entry IVs was sequence, technical, confluent, sequence +
precision, technical + confluence, sequence + precision + technical, and sequence +
precision + confluence. Total N of 44 was reduced to 37 with the deletion of the
independent variables of precision, sequence + technical, precision + confluence,
precision + technical + confluence, and sequence + precision + technical + confluence; as
well as, the dependent variable Hardships. There were no univariate or multivariate
within-cell outliers at α = .001. Results of evaluation of assumptions of normality,
homogeneity of variance-covariance matrices, linearity, and multicollinearity were
satisfactory.

With the use of Wilks' criterion, the combined DVs were significantly affected by
learning pattern combinations, F (18, 83) = 1.87, p < 0.05. The results reflected a strong
association between learning pattern combinations and the combined DVs, η² = .62. See
Table 14.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Λ</th>
<th>F</th>
<th>df₁</th>
<th>df₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Pattern</td>
<td>0.38</td>
<td>1.87</td>
<td>18</td>
<td>82.51</td>
</tr>
</tbody>
</table>

Significance at p < 0.05

To investigate the impact of the main effect on the individual DVs, three
univariate ANOVAs were performed. Results of the ANOVAs indicated processing
pattern combinations significantly affected challenging assignments, $F(6, 31) = 3.35$, $p < 0.15$, partial $\eta^2 = .39$; Events Dealing with People $F(6, 31) = 2$, $p < 0.1$ partial $\eta^2 = .27$; and Other Events $F(3,31) = 2.17$, $p < 0.1$ partial $\eta^2 = .30$. See Table 9 for the univariate follow-up tests.

Before running post hoc analysis, Levine's test for each of the univariate ANOVAs was found to be not significant indicating group variances were equal. The

<table>
<thead>
<tr>
<th>Table 15.</th>
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</thead>
<tbody>
<tr>
<td><strong>Significant F-tests for univariate follow-up tests</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Challenging Assignments</td>
</tr>
<tr>
<td>Events Dealing with People</td>
</tr>
<tr>
<td>Other Events</td>
</tr>
</tbody>
</table>

* Significant $p < 0.05$, ***Significant $p < 0.10$

Tukey HSD post hoc revealed significant processing pattern differences were observed for Challenging Assignments between individuals whose learning pattern combination is technical + confluence and those whose pattern combinations are sequence, technical, or confluence pattern. It also revealed learning pattern differences for Other Events. Individuals whose learning pattern combination is sequence + precision + confluence differ significantly from those whose learning pattern combination is sequence or technical. See Table 16.

In summary, this study indicates that there is a connection between the processing patterns leaders primarily use and events they find significant in their development. That is, significant differences exist between events participants found significant based on differences in their processing patterns.
Table 16.

*Significant Mean Difference t-Tests (all significant at $p < 0.1$)

<table>
<thead>
<tr>
<th>Effect</th>
<th>Comparisons</th>
<th>Mean Difference</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenging</td>
<td>Sequence x Technical &amp; Confluence *</td>
<td>-1.575</td>
<td>-2.877</td>
<td>-.273</td>
</tr>
<tr>
<td>Assignments</td>
<td>Technical x Technical &amp; Confluence</td>
<td>-1.450</td>
<td>-2.942</td>
<td>.082</td>
</tr>
<tr>
<td></td>
<td>Confluence x Technical &amp; Confluence</td>
<td>-1.533</td>
<td>-3.202</td>
<td>.135</td>
</tr>
<tr>
<td>Other Events</td>
<td>Sequence x Sequence, Precision, &amp; Confluence</td>
<td>1.2917</td>
<td>-.093</td>
<td>2.676</td>
</tr>
<tr>
<td></td>
<td>Technical x Sequence, Precision, &amp; Confluence</td>
<td>1.417</td>
<td>-.145</td>
<td>2.979</td>
</tr>
</tbody>
</table>

* Significant at $p < 0.05$

**Discussion**

The purpose of this study was to draw from the learning literature to investigate how differences in individual learning processes, impact leadership development. Results suggest that the leaders’ learning pattern combinations did impact the events that they recalled as being significant to their development as a leader.

**Findings**

The LCI deals with the combination of dominance in learning patterns to understand how individuals learn. These pattern combinations can help identify tendencies and characteristics when examined in a group. The results of this study show a higher incidence of sequence and/or precision patterns than other patterns present.

Findings also show that strong-willed pattern combinations (combinations with two or three patterns dominant) were represented at a higher rate than dynamic learning pattern combinations (combinations with only one pattern as the dominant pattern) or bridge
learner combinations (combinations were all patterns are neither dominant or avoided in their use).

The events chosen by students showed the vast majority of the students chose events considered challenging assignments as significant to their leadership development. Events Dealing with People was the next most frequently listed type of event.

When examining the relationship between learning pattern combinations and the events individuals found significant, individuals who primarily used technical and confluent processing patterns differed significantly from those who used only sequence, technical, or confluence in Challenging Assignments. They found Challenging Assignments significantly less significant than the individuals with the other pattern combinations identified. The Mean scores also indicate they found Events Dealing with Other People to be significant more often than any other pattern combination.

Theoretical Implications

It is interesting, but not surprising that there was a higher number of participants who had sequence and/or precision as a dominant pattern. Although there is no research showing how the population in general scores on the LCI, the number of participants scoring at the Use First level for sequence and/or precision seems representative. These findings are similar to those of Cela-Ranilla (2008), who also found a large proportion of participants from higher education institutions with sequence and/or precision at a Use First level. The Mean of Sequence in Cela-Ranilla (2008) was 26.3 and the Mean for Precision was 25, which were very similar to the Means from this study. This indicates that a trend of high sequence and precision scores may exist in students in higher education. The trend for high sequence is also supported in a study done by Cumberland
County College, which showed a Mean of 26.6 for sequence (Cela-Ranilla, 2008; Cela-Ranilla & Cervera, 2013).

Cela-Ranilla (2008) also found that women have significantly higher levels of sequence than men and men have significantly higher levels of technical patterns than woman. This is important to note as our sample size was 61% female and Cela-Ranilla’s (2008) was 63.5% female. Since both studies had similar percentages of female participants, this gender difference may have contributed to the high Means in sequence scores from this study.

There is a tacit understanding from the practitioners who use the tool, that most formal education in the United States is geared toward individuals who have higher sequence and precision scores (P. Maher, personal communication, July 12, 2012). This may be another explanation for the high Means in sequence scores. These students tend to learn best when information is structured and contains detailed facts. Research is also starting to support this explanation (Cela-Ranilla, 2008; Cela-Renilla & Cervera, 2013).

If it is true that the education system in general is geared toward these individuals, it makes sense that they have a higher representation in our sample. These students would be more likely to succeed and or excel in an educational environment geared toward their learning patterns. In turn, they would also be more likely to get into institutions of higher education and therefore, more likely to be in a leadership position.

As previously noted, these patterns do not work in isolation, but rather interact. The pattern combinations showed a majority of students profiled as dynamic learners, followed by strong-willed learners, and one bridge learner. These findings are similar to those found by Cela-Ranilla & Cervera (2013) in which 83% of the participants were
dynamic learners, 11% were strong-willed learners, and 6% were bridge learners. This may indicate that the vast majority of individuals in higher education institutions are dynamic learners. It may also indicate that strong-willed learners make up a larger percentage of individuals in leadership positions.

It is not surprising that strong-willed learners may make up a larger percentage of individuals in leadership positions. With dominance in three of the four patterns, strong-willed learners have the ability to take on and complete complex tasks by themselves. Since they use three of their patterns dominantly they can utilize them more than an individual who only has one or two patterns at use first. This allows for a certain level of independence and autonomy, which helps them get things done (Johnston & Dainton, 2004). It also allows them to be more flexible in their learning, because they can use more patterns at a higher level. Research indicates that individuals who are able to learn new skills and learn how to deal with on the job challenges develop better and are more successful leaders (Lombardo & Eichinger, 1989; Lombardo & Eichinger, 2000; McCall et al., 1998). This may indicate that individuals who have multiple dominant processing patterns have an advantage in developing leadership and succeeding in leadership positions. However, more research needs to be done to explore this possibility.

When examining the significant differences between individuals with different pattern combinations, it may not be surprising that the individuals with the combination of technical and confluence as the dominant scores differed so significantly from the several other pattern combinations. If the majority of the group had low scores in both technical and confluence it would exacerbate the differences between the group and those who predominantly use technical and confluence together. This is because the individuals
with the lower processing scores in the technical and confluence patterns will tend to avoid processing and learning the way the individuals with dominant technical and confluent processing patterns prefer to process and learn. The participants who scored at the Use First level with both technical and confluence process information very differently than the rest of the group. Since the participants with dominance in both technical and confluent patterns need their information presented in a way the majority of the group avoids processing information, this may make it harder for individuals to get what they need. The significant differences in events chosen by individuals with a technical and confluent learning combination pattern also suggests these individuals find less significance, in terms of leadership development, in the assignments they complete as they do from the individuals with whom they interact.

It is not surprising that individuals with dominant technical patterns showed significant differences from individuals with other dominant patterns. These individuals work better alone and like to get things done in a quick and efficient manner. They can also seem rude because they always want relevance, don’t share their thoughts, and don’t want any more information than they need to get it done. They tend not to talk about things, but rather prefer to just do them (Johnston, 1994; 1995; 1996b; 1998). In addition, if as research suggests, the majority of college students have sequence as a dominant pattern, this would exacerbate the relationship issues caused by dominant technical traits.

As previously noted, individuals with dominant sequential patterns like order, planning, examples, consistency. This clashes with many of the things individuals with dominant technical patterns need to learn. The needs of the individuals with a dominant pattern in sequence also clash with the needs of individuals with a dominant pattern in
confluence. As discussed earlier, confluent learners like to think outside the box, create new things, share new ideas, take risks, improvise, change things up, etc. Some of these might work in the planning stage for individuals with high sequence, but would cause tension when the individual with high sequence was trying to complete things step by step. The confluent individual would feel constrained and stifled and the sequential individual would feel like the confluent individual won’t just buckle down and follow through.

So, if both technically dominant and confluentely dominant individuals both have learning patterns which conflict with sequencially dominant individuals, it would make sense that individuals with both patterns dominant would be more likely to have issues working with individuals who have sequence as their dominant pattern. This seems to be a good explanation as to why individuals with dominant patterns in technical and confluence view the significance of events differently from individuals with dominant scores in sequence. The data shows this was the most significant difference between groups in Challenging Assignments.

However, it was striking to find the significance between those who had only confluence or technical patterns at the Use First level verse those who had both at the Use First level. There may be several reasons for this difference. First, it is the combination of learning patterns that is key to how an individual learns rather than just the strengths of the individual patterns themselves. Also, the level of sequence may have confounded the results. If you have only one pattern as dominant, you are more likely to have higher scores in the remaining patterns. This coupled with the high mean score for sequence suggests that the individuals who are dominant in only technical or only confluence are
more likely to have higher sequence score than those who are dominant in both technical and confluence. This higher sequence score would promote the same issues as exist between individuals with dominant sequence scores and individuals with dominant scores in technical and confluence. The higher sequence scores would provide more common ground with which to work with the individuals who had sequence as a dominant pattern.

The conflict in needs of individuals with a dominant technical pattern and a dominant sequence pattern, may also explain the significant difference in the Other Events category between individuals with technical as a dominant pattern and the combination of sequence, precision, and confluence as dominant patterns. The data showed, when looking at differences in challenging assignments that technical and confluence patterns differed significantly from sequence. It is likely that the individuals who had dominant patterns of sequence, precision, and confluence also avoided using the technical pattern.

In strong-willed learners, the fourth score, in this case technical is often at the avoid level. If a pattern is at the avoid level, it takes a great deal of energy and concentration to use that pattern. It makes sense therefore that those who use technical as their dominant pattern would differ significantly from those who avoid using that pattern of processing information. They would have almost opposite needs based on their learning patterns. Research shows, when individuals have different dominant learning patterns and lack an awareness of their learning patterns, they have trouble providing information in a way that is well received by individuals with other dominant learning patterns (Johnston, 1996b; 1998).
An alternate explanation might be that the Other Events category contains so many random events that there is no real coherence to it. This might be caused by the Other Other micro category, which contains all the events that did not fit in the other categories. The lack of coherence to the Other Other category may have caused anomaly.

The final significant variance is between individuals with sequence as their dominant pattern and those with sequence, precision, and confluence as dominant patterns. This is confounding. There seems to be no conflicts between patterns as technical is likely at the avoid level and sequence is dominant for both. It is possible that the difference is simply due to the fact that the categories in Other Events contain the Other Other micro-category, which contains miscellaneous events.

The results of this study seem to indicate some consistency between students, executives, and to some degree middle management as to what type of events are significant to their development as leaders. If executives and students see the same types of events as significant, it indicates there is a factor other than experience that determines what events individuals find significant in their leadership development. Results of the study indicate that one of those factors might be the way individuals’ process information. There were significant differences between the different processing pattern combinations and which events the participants found as significant to their leadership development.

**Practical Implications**

The findings of this study provide a starting point to examine the individual differences in leadership development based on learning patterns. It shows that there is a relationship between individual learning pattern combinations and the events individuals
indicate as significant to their leadership development. Determining how individual learning combinations influence leadership development has not been previously examined. This opens a new avenue of research in the leadership development literature.

Although further research needs to be done to examine this relationship, it indicates that one's learning pattern combination may determine the type of events individuals find significant. If one can predict what leadership development events an individual finds significant based on that individual's learning pattern combination, one can start to individualize leadership development. The ability to individualize leadership development effectively would allow individuals to develop leadership more quickly and more effectively. It would allow leadership development programs to create the opportunities individuals need most in order to develop.

A practical implication unrelated to the research question from this study is the possible relationship between success in the educational system and dominant sequence and/or precision learning patterns. The findings in this study along with the findings in Cela-Ranilla (2008), as well as, Cela-Renilla and Cervera, (2013) may indicate a trend in higher education. As previously mentioned, the education system may be geared more toward individuals with dominant sequence and/or precision patterns. This means that those individuals who do not have dominant sequence and/or precision patterns are at a distinct disadvantage in the education system and may have trouble getting into institutions of higher education. If strong evidence can be found to show educational systems favor a particular type of learner over another, it may spark a major restructuring of how the educational system teaches students.

Limitations
Although this study was conducted with great care, limitations in research are unavoidable. There are several limitations to this research. Highlighted below are some of the more significant limitations of this study.

There was no statistical measure that was an exact match for examining the research question posed by this study. MANOVA was used because it was the best fit to examine the relationship between individuals' learning pattern combinations (categories) and the frequencies of mentions of events they chose as significant learning opportunities to their leadership development.

This interview and survey study included only a small number of participants. This limits the inferences, which can be made, based on the research and the strength of the statistical analysis. This limit also may have influenced the number of processing pattern combinations represented in the study.

Another limitation is the inability to compare the breakdown of LCI scores from the participants against standardized values in the general population and standardized values in the college student population. This limits the inferences one can make about the data. Without a reference point for the college student or general population one can only speculate about the high number of sequence and precision scores. This in turn also limits one's ability to understand the impact those scores might have on the variances in events.

**Future Research**

This study is the first to explore the relationship between learning processing patterns using ILM and events individuals find significant to their leadership development. Our study found a relationship does exist between the two, but there are
still many questions to be answered. It would be helpful to replicate this study using more participants to get a better view of the relationship between the processing patterns and the events. This might paint a clearer picture of the relationship discovered in this study and determine if there are other significant relationships which were missed because of a limited number of participants.

It would be beneficial to examine the relationship between the processing pattern combinations and the types of lessons individuals learned from these events. This may provide a good understanding of what individuals with different processing pattern combinations actually learn from events they identify as significant to their leadership development.

Finding a relationship between individual processing patterns and events identified as significant opens up a new avenue of research within the leadership development literature. As stated previously, there are no studies done to examine how individual learning or processing effects how individuals develop as leaders.

As leadership development continues to progress and colleges and universities examine ways to better develop leaders, this line of research may allow them to provide opportunities designed for specific individuals. First, this enables people to realize that not all individuals respond well to different types of leadership development events. Taking these difference into account allows one to understand what types of events are significant for individuals with different processing patterns. By understanding what events are significant to an individual’s leadership development based on his/her processing patterns, colleges and universities can tailor their leadership programs in more effective ways.
Works Cited


Appendix A

Key Events: Definitions and Examples for Coding

1. Challenging Assignments – The focus of this category are events, which focus on a specific type of assignment.
   1. Start From Scratch
      i. This event refers to building something from nothing or almost nothing.
      ii. Example: Starting a new club/organization
   2. Fix-it/Turnaround/Growing to the next level
      i. Turning around or stabilizing a failing program.
      ii. Example: Taking a club with 10 members and growing it to 100
   3. Project/Task force/Program
      i. Projects or tasks, which are temporary in nature and have a specific deadline, beginnings and ends. Often involving unfamiliar content/activities and possibly involving building new relationships.
      ii. Example: Putting on a leadership conference. Creating a budget.
   4. Change in Scope and/or Scale
      i. Broadened scope or scale of responsibility, which added new elements. Job expands or you move up a position.
      ii. Example: Getting elected to a higher leadership position
   5. Organization Switch
      i. Taking a position in another organization, which requires the individual to do things in a different way.
      ii. Example: Moving from an executive board position in one organization to one in another organization who’s culture is different
   6. Breaking a Rut
      i. Leaving a successful position to find something new and more challenging.
      ii. Example: Quitting one position in which the participant was successful to do something completely different.
   7. Pre-leadership Experience (Modified from Early Work Experience and Moved)
      i. Experiences, which took place early in a participant’s leadership career, often in non-leadership role, which exposed them to new environments. Sometimes characterized by ambivalence.
      ii. Example: Being a member of an organization and taking on responsibility for something.
   8. First Leadership Role in college (Modified from First Supervision and Moved)
      i. First time overseeing someone else.
ii. Example: First time leading a group.

9. Business Success (Moved)
   i. Events, which seemed doomed to fail and which turned out extremely well.
   ii. Example: An event where you expected 5 people to attend was attended by 50.

10. Other Challenging Assignment (New)

2. Hardships – These events have three characteristics: (a.) Individual’s accepted appropriate personal responsibility for the mess they were in; (b.) during the worst of it, they experienced a strong sense of aloneness or lack of control over events; and (c.) the situation forced them to confront themselves.

   1. Business Mistake
      i. Shortcomings, mistakes which derailed success.
      ii. Example: Didn’t advertise a program and nobody came.

   2. Lousy Job/Missed Promotion
      i. Position and person’s perceived skills did not match. Event seen as a setback.
      ii. Example: Didn’t get elected to a position he/she really wanted.

   3. Problems with others
      i. Situation where something bad happens with people -- that was not related to personality conflicts. People quitting midway, etc.
      ii. Example: A President having to tell a treasurer he/she isn’t doing his/her job correctly.

   4. Race Mattered
      i. Experienced or observed a racial injustice due to prejudice or discrimination.
      ii. Example: Noticed the organization didn’t invite as many Asian students to join as they did Hispanic students.

   5. Gender Mattered
      i. Experienced or observed an injustice due to prejudice or discrimination based on gender.
      ii. Example: Noticed the only student government positions help by women where the ones in which they did not run against a male.

   6. Personal Trauma
      i. Unexpected tragedies stemming from either personal or work life which had a powerful emotional impact and put the individual in crisis.
      ii. Example: Death in the family, cancer, etc.

7. Other Hardship (New)
3. Events Dealing with other people – Events in which another person or persons were the central feature of the event.

1. Role Models
   i. Superiors (either students in a higher leadership position, supervisors or faculty/staff) with whom the participant interacted or observed and profoundly influenced the participant's leadership (either from positive, negative, or a mix of positive and negative actions/skills/traits).
   ii. Example: Saw how a President ran the organization and emulated his/her style.

2. Values Played Out
   i. Short lived events where the participant was either involved or observed an interaction which took place and left strong imprints of behaviors to emulate or avoid.
   ii. Example: Saw John yelling at Sally and didn’t want to be like John.

3. Mentors
   i. These events revolve around a superior who took special interest in the participant and helped them through a transition.
   ii. Example: Older student showing a new student the ropes.

4. Peers
   i. Interactions with peers either negative or positive which affected the participant's leadership.
   ii. Example: Working with a friend on a project. Working with diverse groups.

5. Feedback (Moved)
   i. Events in which the participant was given feedback (+ or -) or recognition related to performance, pivotal conversations, nominations, getting elected, etc.
   ii. Example: As president, having the members of your executive board tell you how bad of a job you are doing or getting nominated for an honor's society.

6. Role Modeling/Mentoring (New)
   i. Events in which the participant was a role model or served as a mentor for another person (in either an informal or formal capacity)
   ii. Example: An RA who looked out for a specific new student to get them involved on campus.

7. Other Events Dealing with People (New)

4. Other Events – Events which do not fit into the previous 3 categories

1. Coursework
i. Work from formal academic courses or formal trainings, attended by participants, which gave information or provided experiences not part of participant’s everyday routine.

ii. Example: Going to a leadership retreat and interacting with leaders from other schools/organizations.

2. Purely Personal
   i. Range of experiences outside of college that contributed to the participant’s leadership development.
   ii. Example: Climbing a mountain or running a marathon.

3. Pre-College (New)
   i. Any event that happens prior to starting college
   ii. Example: An event the summer before school or an event in high school

4. Other Other Events (New)
Appendix B

Carnegie Classification Definitions

Enrollment Profile

**High Undergraduate.** These institutions enroll both undergraduate and graduate/professional students, with undergraduates accounting for 75 - 90 percent of FTE enrollment.

**Majority Undergraduate.** These institutions enroll both undergraduate and graduate/professional students, with undergraduates accounting for 50 – 75 percent of FTE enrollment.

Size & Setting Classification

**Small four-year, highly residential.** These institutions report FTE enrollment of 1,000-2,999 degree-seeking students at an institution, which grants at least a bachelor’s degree. At least 80 percent of the students attend full time and more than half of the degree-seeking undergraduate students live on campus.

**Medium four-year, highly residential.** These institutions report FTE enrollment of 3,000-9,999 degree-seeking students at an institution, which grants at least a bachelor’s degree. At least 80 percent of the students attend full time and more than half of the degree-seeking undergraduate students live on campus.

**Large four-year, primarily residential.** These institutions report FTE enrollment of over 10,000 degree-seeking students at an institution, which grants at least a bachelor’s degree. At least 50 percent of the students attend full time and 25-49 percent of the degree-seeking undergraduate students live on campus.
Large four-year, highly residential. These institutions report FTE enrollment of at least 10,000 degree-seeking students at an institution, which grants at least a bachelor’s degree. At least 80 percent of the students attend full time and more than half of the degree-seeking undergraduate students live on campus.

Basic Classification

Master's Colleges and Universities. These institutions generally award fewer that 20 doctoral degrees and at least 50 master’s degrees during the reporting year. These do not include Tribal Colleges and institutions with special focuses.

Doctorate-granting Universities. These institutions generally award more than 20 doctoral degrees, not including doctoral-level degrees that allow awardees to enter professional practice (e.g. JD, MD, etc.). These do not include Tribal Colleges and institutions with special focuses.