

Match-Making to Enhance the Mentoring Relationship in Student Teaching: Learning from a Simple Personality Instrument

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Abstract

Four student teachers in secondary science education were matched with cooperating teachers based on four personality constructs identified from a simple Myers-Brigg type inventory. Placement decisions were based on compatibility of primary or secondary temperaments informing pedagogical approach in the classroom and particular skills needed for mentorship. Teaching dyads were most fruitful where primary or secondary temperaments were in common, but not both. Some level of dissonance in temperaments fostered pedagogical growth in one student teacher. All temperaments studied supported learning to teach science with unique strengths. One construct called “relational” appeared necessary in mentor teachers for fostering relationships with ample support and communication.

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Introduction

The most valued experience in teacher education programs is the student teaching practicum or internship (McIntyre, Byrd, & Foxx, 1996). Student teachers (interns) enter their cooperating teachers' classrooms with enthusiasm and high expectations that they will be able to implement their preferred approach to planning and teaching, receive adequate guidance and support, and learn from an otherwise experienced authority (Munby & Russell, 1994). Most of them enter internship after reflective field experiences that have helped them better understand their values and beliefs as well as pedagogical skills as beginning teachers (McLean, 1999). They hope to be placed with a cooperating teacher who will support their preferred approach to teaching and needs in learning to teach, and not clash with them. Their positive attitude and overall experience in the internship depends on meeting this expectation (McIntyre, Byrd, & Foxx, 1996).

Though past research has highlighted the socializing influence of the cooperating teacher on the intern (Su, 1992), this influence can greatly vary depending upon the nature of classroom contexts and teacher practice (Copeland, 1980). The influence of the cooperating teacher in shaping intern practice depends upon multiple factors. Some of these factors include congruence of teacher practice with university program, quality of

ongoing mentorship, university-school collaboration, and proper mentor matching (Potthoff & Alley, 1996). Exemplary practitioners alone do not shape intern practice as much as individuals who provide explicit and quality feedback (Borko & Mayfield, 1995). Even so, interns are more willingly influenced in practice by cooperating teachers whose views about teaching and learning are closely aligned to their own initial beliefs (Bunting, 1988; Graham, 1997). In such cases, the fruitfulness of the match from a constructivist perspective is in the scaffolded learning and advancement of skill that occurs, and not in the compliance and tact needed to complete the experience (Lacey, 1977).

Programs in teacher education emphasize the quality of classroom instruction and the mentoring role of cooperating teachers in internship. However, little attention has been paid to matching the personality qualities of interns with a suitable cooperating teacher. Mentor matching has existed as a consideration for field placements for some time now (Leslie, 1971; Mahlios, 1982). Yet, few large university programs, if any, systematically consider mentor-matching as an important consideration in placing interns (McIntyre, Byrd, & Foxx, 1996). Internships were shown to be more productive when matches were made where interns felt suited to their teacher (Potthoff & Alley, 1996). Practical considerations from the perspective of practitioners allude to the importance of proper matching, considering such personality qualities as temperament, degree of flexibility, and structure (Croker, 1999). For example, interns needing more guidance and structure for their experience should be placed with cooperating teachers who are suited to provide it.

Recent research that has reconsidered the relationship between interns and cooperating teachers has brought up supportive qualities including emotional support, peer relationship, collaboration, flexibility, and feedback (Beck & Kosnik, 2002; Sudzina, Giebelhaus, & Coolican, 1997; Zeichner, 2002). Beck and Kosnik (2002) conclude that the elements most valued by interns had to do with their relationship with their cooperating teacher. Conflict with the cooperating teacher is often cited as one of the major reasons given for failing internships (Harwood, Collins, & Sudzina, 2000). Successful matches would be characterized by greater rapport, more communication, and a more trusting and harmonious relationship (Koerner & Rust, 2002; Knudson & Turley, 2000; Stanulis & Russell, 1999). Information that can help to foster better relationships between cooperating teachers and interns would likely support the success rate of internships and learning from it.

In this research we studied the working relationship between four cooperating teachers and their interns through the framework of a four-quadrant personality instrument that is based on the Myers-Briggs type indicator (Bryce, 2002). We wanted to learn if the information from this instrument on temperament styles would be fruitful in our thinking on intern placement through strengthening relational qualities based on personality traits. Specifically, we wanted to know if the personality constructs of the instrument were congruent with the predominant philosophical (teaching and learning) and mentoring concerns of secondary science interns and their cooperating teachers. Sharing similar philosophical and mentoring concerns would likely strengthen the

relationship between cooperating teacher and intern, leading to a more productive internship. Applying these and similar constructs in practice could support placement coordinators in having additional information for making stronger individual field placements with higher rates of satisfaction and success in learning to teach.

A Complex View of Mentoring in Internship

Proper mentoring in preservice teacher education depends upon the mentor's support of interns as they make the transition to classroom teacher (McNally, Cope, Inglis, & Stronach, 1997). This support includes modeling effective practice as well as a generous dose of supportive feedback on intern performance. Properly trained and effective mentors can make a difference in the learning experience of interns when both parties are committed to mutually shared goals of teaching and learning (Sudzina et al., 1997). Mutually shared goals can range from more global perspectives, such as a common philosophy of education, to more specific ones, such as how to manage and discipline students in the classroom. Lack of mutually shared goals is indicative of a mismatch between teaching philosophies, styles, or needs of the intern in learning to teach. Even with strong mentors, internships can be difficult if there is a mismatch in teaching styles that can lead to personality conflicts between parties (Agee, 1996; Graham, 1997; Sudzina et al., 1997). For example, placing an intern who has a traditional view of teaching with a more progressive cooperating teacher can lead to built-in conflicts over planning and teaching that cannot be resolved (Graham, 1997). Agee (1996) documented through case studies of cooperating teacher-intern relationships that compatible teaching philosophies supported rapport and learning in internships. These examples support a constructivist view of learning in internship where dialogue on mutually understood and embraced teaching goals is an important part of learning and growth in internship (Moll, 1990). It also shows that successful mentoring relationships depend as much on interns and their predispositions as they do on cooperating teachers and their mentorship skills.

A broader framework for viewing the mentoring role of cooperating teachers must study the dyadic relationship between the cooperating teacher and intern. This framework does not negate the trainable attributes of good mentors, but does not take the technical-rational view that well trained mentors alone will always foster strong internships. In viewing mentoring as complex, one must take the constructivist perspective that looks at prior personalities, values, and understandings of participating parties as well as particular needs of interns (Martin, 1996).

Mentoring is complex, not least because although the novice teacher's professional development is the central focus, this is influenced by the individual personalities of the subject mentor and the novice teacher, the novice's individual needs (their starting point and the 'baggage' they bring with them), and the mentor-novice relationship, which will itself change over the course of the programme. (p. 43)

Through this framework mentoring is viewed as a shared enterprise between cooperating teacher and intern with success depending upon both individuals (Sudzina et al., 1997). Interns are not blank slates but bring their own expectations and ideas to internship of what they expect and need from their cooperating teachers. Interns must be placed with cooperating teachers who can meet these unique expectations and needs through shared philosophies, needed strengths, and compatible personalities that foster strong rapport that drives the desire to learn and grow professionally (Sudzina et al., 1997).

A complex approach to mentoring also considers cooperating teachers' varied styles of mentoring that may or may not be compatible to interns' learning needs (Graham, 1993). Again, in this dyadic relationship the role of teaching philosophies and preferred styles of practice play an influential role. Beliefs and teaching styles of cooperating teachers have a parallel influence on mentoring styles, showing strong similarity in practice (Hawkey, 1998; Martin, 1997). A cooperating teacher who provides a highly structured environment and curriculum for her students is likely to provide similar structure for her intern, rather than allowing the intern immediate independence in practice. An intern may not need or want *mentoring through structure* if she is already highly organized and has a preferred approach to planning and teaching. On the other hand, the dissonance created by such a cooperating teacher for a less organized intern can lead to important growth and development in this area (Crocker, 1999; Hawkey, 1998). Compatibility pairing of cooperating teachers and interns on mentoring styles and learning needs may work best through knowing what each participant provides and needs from the dyad. A reduction of dissonance to learning levels, while maintaining a high level of compatibility between pairs, would be the goal of this matching. Such pairing may be promising in supporting relationships based on preferred teaching approaches while also targeting the learning needs of interns.

Four Colors Personality Inventory

Personality theorists, Donald Lowry and Nathan Bryce, simplified the complicated labels of the Myers Briggs Inventory into four colors to represent predominant temperaments: Blue, green, gold, and orange (See Table I).

Table I

Comparison of personality type categories of Myers-Briggs and Lowry-Bryce.

Myers/Briggs	ENFJ INFJ	ENTJ INTJ	ESTJ INTJ	ESFP ISFP
	ENFP INFP	ENTP INTP	ESFJ ISFJ	ESTP ISTP
Lowry/Bryce	Blue	Green	Gold	Orange

These temperaments form the basis of personality inventories and have application in parenting, workplace relationships, education, and counseling (Lowry, 1990). Based on the four-color temperament classification, each person can be described best by one color that fits his or her personality more than any other (Bryce, 2002). This is the individual's primary color or temperament. In addition to one's primary color, the secondary color provides additional personality description and usually supports the

primary color. The fourth color is the least developed temperament because an individual is not often described by its characteristics. By understanding an individual's primary color, one can better understand an individual's predominant personality traits. The utility of the four temperaments is in better understanding how people react to situations and each other. Temperaments direct people emotionally through everyday life, whether a person is easily depressed, casual, formal, careful, or carefree (Hartman, 1987). Teacher knowledge of one's predominant temperament can enable conscious change in behavioral interactions with others, personal professional development, and understanding of the predominant behavior of others (Pankratius, 1997; Rosenfeld & Rosenfeld, 2006).

The Insight Learning Inventory© was chosen for this study because it presented the four colors in ten different categories, many of which related to teaching and interacting in the classroom (See Appendix). These categories focus on values, communication, motivation, work, supervision, recreation, childhood, youth, education, and love. Once categorical statements were read, each statement was given a rating. The rating for each category ranged from 1-4 with 4 meaning this statement is always like me and 1 meaning the statement is seldom like me (Bryce, 2002). Answers are tallied from each response keyed to a specific color to reveal the sum score for the four temperaments: gold, orange, green and blue. An individual's color spectrum is determined by the total numeric score for each color with the highest number or brightest color as primary with subsequent color scores below it (Bryce, 2002).

The color spectrum allows the individual to see a visual image of one emerging. The image shows traits that temper actions, preferences, likes, and dislikes. The combination of these four colors (color spectrum) characterizes the person (Hayward, 2001). Color traits have been used to shed light on teachers' and students' interactional styles in the classroom; how the teacher teaches and how individual students learn best (Bryce, 2002). In this study, color traits were applied to interactional styles between cooperating teachers and interns in planning, teaching, and mentoring in the classroom. Qualities or characteristics of each predominant color type composed the theoretical framework for thinking in this study. A synopsis of the general temperament or personality characteristics for each color in the educational setting is described in Table II.

Table II

Comparison descriptions of personality type characteristics of Lowry and Echols (2000).

Blue	Compassionate, supportive, caring, cooperative, communicative, relationship-driven, encouraging, flexible, harmonious
Green	Problem-solving, expert, investigative, intellectual, competent, logical, autonomous, questioning, intolerant, curiosity-driven
Gold	Ordered, traditional, dependable, duty-driven, accountable, responsible, loyal, routine-driven, controlling, organized, authoritarian
Orange	Change-driven, free-spirited, spontaneous, risk-taking, experiential, expressive, hands-on, informal, entertaining, relevancy-driven

Context and Methods

At the end of their program in our rural southeastern university in the United States, secondary science education interns are individually placed with cooperating teachers for their 15-week student teaching (internship) experience. As program faculty who also teach and supervise these interns, we wanted to strengthen our approach in making placement decisions so that more interns would view their cooperating teachers as meeting their mentoring preferences as well as needs in becoming more proficient in the classroom. In the spring of 2004 we used the results of the Insights Learning Inventory© taken by our cooperating teachers and interns prior to placement to inform our discussions and placement decisions. Our goal was to better meet interns' mentoring wants and needs through placement with a compatible cooperating teacher. We also wanted to further develop the mentor-protégé relational qualities that we knew supported a successful internship.

Four interns and their cooperating teachers agreed to participate in our study of compatibility and mentor-protégé relationship in the internship. Each of these cooperating teachers had a minimum of ten years of science teaching experience and was known as a leader in their respective schools – all were department heads or chairs. Past collaboration with these teachers showed that they varied in predominant teaching approach and style but were considered effective teachers in practice. All of them regularly used the laboratory in science teaching. The Insights Inventory results informed our placement discussions through a deeper consideration of predominant and secondary temperament styles as characterized by color (blue, gold, green, orange) in the Inventory. Based on the literature and our past experience we viewed these styles or colors as a human construct that could potentially help in our understanding of preferred teaching and mentoring styles. In this way, we did not view the Inventory from a positivistic stance as it was intended but from a constructivist one, emphasizing its usefulness for us (Von Glasersfeld, 1989). We also viewed the Inventory's numerical results as a beginning point of thinking about each participant, feeling more strongly about the usefulness of the constructs themselves than the fidelity of the numerical scores. Placements decisions began with science subject area major. Then, we sought compatibility by placing interns and cooperating teachers together who shared one or more of their highest scoring colors (predominant or secondary temperament) while also considering the mentoring needs of interns based on anecdotal evidence from lived experience with them in our classrooms and prior field placements (Van Manen, 1990). The goal of placement was to meet interns' mentoring needs as we saw them along with meeting their preferred styles of teaching as informed by the Insights Inventory. Table III shows intern-cooperating teacher pairing, inventory results, and school level and course taught in internship. Pseudonyms are used in this study.

Table III

Intern and cooperating teacher pairings informed by inventory results.

Intern	Inventory Score: Blue, Gold, Green, Orange	Cooperating Teacher	Inventory Score: Blue, Gold, Green, Orange	School Level and Course
Mary	36, 26, 17, 16	Forrest	20, 28, 25, 24	High School: Environmental Science and Biology
Rose	24, 21, 23, 27	Michael	20, 17, 33, 31	Middle School: Integrated Science
Nate	22, 22, 30, 29	Tamara	19, 20, 26, 15	High School: Chemistry and Physics
Bonnie	29, 32, 30, 20	Leslie	26, 33, 32, 20	High School: Chemistry and Physical Science

The two co-researchers of this study had previously taught and later each supervised two of the four interns in this study. We felt that we had a unique perspective and understanding of these participants and their experience as students in our program. Along with this understanding, we had placed, studied, and supervised interns for five or more years each. This experience informed our understanding of the internship process and difficulties experienced by interns. Thus, we were well poised to take a phenomenological perspective to this study, where participants and co-researchers together brought insight to this lived experience and a powerful combined understanding for a deeper interpretation of it (Van Manen, 1990).

During intern supervision, each co-researcher took copious field notes of observed teaching practice, areas needing professional development, and advice shared between teachers and supervisor. These notes informed researchers' understanding of each intern's teaching experiences, strengths and weaknesses, and brought deeper interpretations to the results of this study. Each university supervisor as co-researcher interviewed the participants (intern and cooperating teacher) individually in their two cases during the middle and end of the internship. The first semi-structured interviews focused on the *gathering of* general data on cooperating teacher-intern working relationship and concrete experiences from which perceptions of compatibility were based. The second semi-structured interviews *reflected on* initial data in light of the personality constructs of the Insights Inventory and how these constructs supported different facets of teacher practice and style in the mentoring process (Van Manen, 1990). Participants also commented on the general idea of using like-temperaments in placement decisions.

Data Analysis

The interview data generated from each of the four cases were analyzed descriptively to make sense of each particular case and the fruitfulness of the mentoring

process, including teaching temperaments and relationship perceived by participants (Merriam, 1998). Field data were used to triangulate responses to questions on intern practice and the cooperating teachers' views of intern practice. Descriptive coding of interview data on issues of temperament characteristics, compatibility, teaching style, and support preceded the development of thematic statements that captured significant aspects of participants' responses and experience (Van Manen, 1990). Examples of thematic statements include, "She needs more help in organization and putting her own ideas into practice," or "Both have a shared passion for science, demonstrations, and relating it to the real world." These thematic statements were later placed into the color category or categories whose characteristics best informed or related to the emergent theme. For example, "She needs more help in organization (gold) and putting her own ideas into practice" was categorized as a gold issue; "Both have a shared passion for science (green), demonstrations, and relating it to the real world (orange)" was categorized as both a green and an orange issue. This approach to categorizing the data by color was an iterative process between re-searching thematic words and phrases from the literature and looking for them in our data (Van Manen, 1990). Co-researchers also worked collaboratively in seeking agreement on the placement of each theme in the appropriate color category. These data were then compared to the Inventory results, checking the usefulness of the four color constructs, and fidelity of the Inventory's temperament scores and ranking in each case.

Lastly, each researcher drafted anecdotal narratives of their two cases that described the mentor-protégé relationship of dyads through story that included essential features of each relationship grounded in lived experience (Van Manen, 1990). Each anecdotal narrative raised the emergent themes specific to each case including the color construct associated with the theme from data analysis. The co-researchers chose anecdotal narrative in telling the story of each intern's experience because of its power to involve the reader personally in the lived experience of each intern, using less abstractive language and technical forms of writing to describe what has been learned in each case. The intent of this approach was to couch our *general* learning from the framework of personality constructs analysis within the *particular* stories of each case.

What is often not seen is that anecdotal narrative as story form is an effective way of dealing with certain kinds of knowledge. 'Narrative, to narrate,' derives from the Latin *gnoscere, noscere* 'to know.' To narrate is to tell something in narrative or story form. The paradoxical thing about anecdotal narrative is that it tells something *particular* while really addressing the *general* or the *universal*. And vice-versa, at the hand of anecdote fundamental insights or truths are tested for their value in the contingent world of everyday experience. (Van Manen, 1990, p. 120)

Each story included vivid descriptions of the mentor-protégé relationship, what worked well between them, and the differences and similarities that were points of tension and support between them. Each narrative describes both the strengths and limitations of each mentoring relationship based on the personality traits of the dyads – identified by color construct – and the ongoing professed needs of each intern. The discussion that follows

the narratives examines the usefulness of our approach, and the Insights Inventory, in creating successful matches in each case. Also, we will further theorize on our work based on what has been learned across cases for possible ideas for further study.

Results

Mary's Story

A blue-gold intern with a gold-green-orange cooperating teacher

Mary was a self-sufficient student throughout her program. She felt comfortable in planning and teaching students. She was adept at using technology in her day-to-day teaching, especially PowerPoint presentations in her lectures, as well as lab-based activities related to her subject matter. This comfort was likely due to her past experience in teaching lab classes in biology at the university before her internship. She also felt very comfortable with interacting with her high school students. This was evident in her frequent use of one-on-one assistance during class. Also, she typically interacted with her students in the classroom before and after class time through instigating discussions on their interests and what they did outside of class. She took a genuine interest in getting to know them personally, and ultimately developed a strong rapport with them – a particularly blue trait.

Mary was known for pulling her work, and lesson plans, together at the last minute. Even so, these lessons were well organized and executed in her classroom – a particularly gold trait. This last minute approach initially worried her cooperating teacher, Forrest, who was concerned about Mary being prepared to teach well in advance of each day – a particularly gold trait. However, once he saw that Mary could pull together and teach a strong lesson, even at the last minute, he worried less about this issue. He initially stressed with Mary how to structure her lessons with appropriate event changes to teach during the lengthier (96-minute) block period, including a hands-on component.

Forrest viewed his role as a mentor in supporting the needs of his interns. This support often took the form of sharing resources and ideas for teaching through a collegial relationship where interns approached him to discuss planning issues and other concerns. Forrest was very humble and approachable. He shared frequently that he was always impressed by the scientific knowledge of the interns placed with him. He valued their understanding of science and intellectual prowess more than their novice abilities – a particularly green trait. His collegial and supportive role for intern autonomy characterized Forrest's relationship with Mary – another particularly green trait.

One of Mary's limitations in teaching was her ability to relate her subject matter to students' lives and interests. Although she took a unique interest in their lives, she seemed to divorce this interest from her lesson's content. Her teaching approach, though well executed, still emphasized core content and principles of science. Forrest raised this concern with Mary and tried to help her to consider how she could better relate her content to students' lives and their personal interests – a particularly orange trait.

Mary continued to develop her relationship with her students throughout her internship – her strong blue trait. She spent time with students that were not successful for her cooperating teacher. Forrest even mentioned that he was also impressed with Mary's desire to spend time trying to reach the students that he could not, reaching them on a personal level. However, his own strong but gentle and collegial working rapport with Mary, as well as past interns, displayed a concerned and supportive ethic that typifies a good mentor – a particularly blue trait not apparent in his inventory results.

Mary was so thankful that she had Forrest for her cooperating teacher. She had heard from so many other interns of the differences that they had with their cooperating teachers, even in overall good placements. She had no qualms at all about Forrest. He, in turn, was once again impressed by the quality of interns that the university sent him. He often said that he could work with anyone.

Rose's Story

An orange-blue-green intern with a green-orange cooperating teacher

Rose was more mature in attitude and age than most students in our program. She recently returned to school after working in the agricultural sector, utilizing her undergraduate and master's degree in agronomy and soils. As a methods student she was placed with Michael, a somewhat disorganized middle school teacher who thrived on learning new science and letting his students do science – a particularly green trait. Michael often spontaneously changed his plans for teaching in order to pursue an area of student interest or tie his teaching to an event in the news – a particularly orange trait. He even retained laboratory activities from year to year that students really liked because they were 'fun' or 'cool.' The downside of this approach is that his lesson plans over time were often characterized as 'jumpy' or inconsistent. Rose greatly appreciated this approach to teaching science, and wanted to become more proficient at it – indicative of green and orange traits. She and Michael individually petitioned us to let Rose come back to his classroom as an intern.

Rose appeared to be organized in her studies, planning, and teaching – a particularly gold trait not apparent in her inventory results. She was an excellent student in the traditional sense, and consistently planned lessons that were strong in inquiry and process. Rose particularly liked the inquiry methods and approach to teaching science that she learned in her program – a particularly green trait. However, like most of our program students, she did not see how she could blur the line between lecture and lab, process and content. Though time in lecture was infrequent, she often delivered too much content at one time, and in a way that often was too complex for students to understand.

Rose appreciated the autonomy that Michael gave her in planning her lessons and teaching as she liked. He treated her as a colleague, and as such, spent time with her discussing science and inquiry approaches to lessons that she proposed – a particular green trait. For example, Michael was especially interested in how Rose would integrate plant science into her plans in a way that would be interesting to students. She did so through a plant growth inquiry project and also interested Michael in the topic – even

when he thought plants would not interest him. However, most of their professional conversations were initiated by Rose who often felt that Michael did not reach out to her to see if she needed help, or to frequently let her know that she was doing a good job or support her when a lesson seemed to fail.

Rose saw herself as caring for her students' learning more than Michael did, and taking time with the ones that seemed to have difficulty – particularly blue traits. Michael felt strongly about not 'babying his students' or being concerned about the personal dynamics and interactions among them. Even in his interactions with Rose, he was direct in his assessment of her performance when asked, even while sharing with us that she was an excellent intern. Rose shared that she did not mind this aspect of Michael's personality because of her own maturity. However, she shared that another younger intern would not get the moral support and teacher initiated feedback needed from Michael.

Like Michael, Rose was very flexible and willing to change her plans in pursuit of a last minute 'better approach' or to integrate a new tie that would help student interest and learning – a particularly orange trait. However, she brought structure to Michael's classroom through her prior planning and preparation of strong lessons, and her institution of new routines and procedures in handling classroom management – a particularly gold trait. She often shared with us that she brought enough structure, organization, and personal maturity to have a successful internship with Michael. Another intern may not fair as well.

Bonnie's Story

A gold-green-blue intern with a gold-green cooperating teacher

Bonnie was a serious student who was knowledgeable of her content area. She believed in having control of her class – a particularly gold trait. She did not like for her students to miss class for reasons that she felt were not important, such as leaving class for prom preparation. Unlike her teacher Leslie who felt that the students could make up the work because prom was part of the high school experience. Bonnie did not like the thought of having to provide makeup work for students.

Bonnie had very high expectations for her students and wanted them to get all they could from her creative lessons and motivating activities. She would provide activities that supplemented and enhanced many concepts that she taught. In doing this, Bonnie felt that students would benefit and learn more because she was going the extra mile to reach many students who had voiced that they had a chance of seeing the lesson in a different way. Bonnie felt that she was developing more of a relationship with the students – a particularly blue trait – caring that each student was learning in different ways other than the more traditional way of her teacher, Leslie. Leslie viewed her own style of teaching as more traditional, not being creative because her training was basic and did not incorporate inquiry approaches. Leslie did implement laboratory exercises as part of her teaching routine of lecture and problem-solving. Leslie believed Bonnie's style reflected inquiry because this had been Bonnie's training in her methods classes.

Bonnie and Leslie agreed on some of the same lessons for instruction but Bonnie felt that her students would learn better through more hands-on lessons, while Leslie felt that students should have more structured and traditional instruction – a gold trait. Bonnie and Leslie both commented that they were somewhat procrastinators but in the end they both realized in their own way they must be organized in working with their students. However, Bonnie was an independent thinker and resented being constantly reminded of teaching tasks that she was capable of doing – a particularly green trait. For example, Leslie had given Bonnie several assignments for the students and kept reminding Bonnie of what she expected. Bonnie felt that Leslie's reminders were a way of exerting control over what she asked Bonnie to do – a gold trait.

Bonnie several times mentioned that Leslie grew more supportive of her preferred approach and competence as an intern – a green trait. Towards the end of internship, Leslie did let her try new activities. Bonnie came up with her own ideas and was encouraged by Leslie not to be scared to try them in the classroom. Bonnie felt as though Leslie trusted her more in the end.

Several times Bonnie and Leslie clashed in their thinking but Bonnie started seeing that she and Leslie were much alike. They like having control and being in control. Bonnie's control was for the sake of the students, where the students could have an outlet for expression – supporting blue trait. Leslie's control was for the students but in the way of making it safe and structured for them. Bonnie realized that if they did clash it was because they were very much alike in their primary and secondary temperaments. Leslie admitted that she was controlling and did not share much about the touchy-feely aspects of the blue temperament. She also shared that she was more rigid whereas Bonnie was more flexible in the classroom with the students. Leslie thought that she and Bonnie complimented each other in that Bonnie brought the more caring element to their fairly similar style of running the classroom.

In the end, Bonnie was glad that she had the opportunity to work with Leslie because in so many ways they were alike. She could not see herself working with a teacher who was not very organized. Both cooperating teacher and intern had to learn to trust each other's judgments and abilities in order to garner respect in their relationship.

Nate's Story

A green-orange intern with a green-gold cooperating teacher

Nate was a fun loving and rather laid back guy. He believed in getting to know the students and building a trusting relationship with them. He liked using demonstrations and hands-on activities. He was very comfortable in an uncontrolled and non-traditional classroom – typical of the orange trait. Nate's teacher Tamara was more structured and did not like a chaotic environment – very typical of the gold trait. She believed in structure with clearly defined rules and directions. Both teacher and intern felt that inquiry was an important part of teaching science – a particularly green trait – but Tamara thought that inquiry and related activities must be planned and organized. Nate on the

other hand saw hands-on approaches as being more spontaneous, fun and engaging – a particular orange trait. However, both teacher and intern emphasized the facts, practical information, and concrete skills.

Nate found his cooperating teacher to be too regimented in her teaching. She did not like interruptions while she was speaking, especially student questions while she was lecturing – a gold trait. Nate answered student questions no matter when they came up. In planning lessons, Nate tended to procrastinate and preferred a sketchy plan so that if issues came up in the class he could address them, rather than having to come back after following a strict lesson plan – a particularly orange trait. Nate valued the spontaneity of the class and wanted some freedom in the class so the students would enjoy learning and doing – orange traits also. He believed that if any assignment or lesson was not fun, the students will not want to do it.

Nate believed in scientific knowledge and was very competent in his content area. He taught using presentations that were somewhat logical and interesting. His activities used in teaching typically explored a critical thinking base, utilizing models, charts, and thought-provoking objects that elicited curiosity in the classroom – particularly green traits.

Nate adjusted to meet many of his teacher's expectations in organization and structure, and genuinely felt that he benefited from it. What they had in common was a desire to teach through inquiry, utilizing demonstration and activities as a predominant approach in teaching. Tamara was impressed and pleased to see this desire in Nate – her green trait. Nate and Tamara both explored and experimented, working with gadgets and toys in teaching physical science. Tamara provided many activities and resources to Nate who used them to engage the students, motivate the students, and encourage the students. Nate shared that Tamara was always there for him if he needed her – a blue trait.

Tamara and Nate were highly collegial in their relationship – green trait – even though Tamara saw herself more in a parental role with Nate as the older son. They ultimately enjoyed working together because even though they differed in structural approaches to teaching, they were similar in their desire to teach through inquiry means. Because of their similarities, Nate believed that they could support each other in their differences. They also both learned from each other in that Nate saw the importance of structure and Tamara saw a need for more flexibility.

Discussion

The fidelity of the Insights Learning Inventory© scores to our observation and interview data on what we learned about personalities in each of these cases revealed mixed results. The difference between numbers in most cases supported the relative spectrum of each individual triangulated from the other data. The exceptions in this study were Forrest whose blue temperament did not show strongly in his inventory (last of all colors) and Rose whose gold temperament also showed last in her inventory. The temperament framework (colors) itself was fruitful in informing our thinking about

placements and the importance of the interplay between dyads' different personalities, abilities, and philosophies of teaching in the mentoring relationship (Von Glasersfeld, 1989).

In our complex view of mentoring, each experienced cooperating teacher in this study provided unique mentoring skills for their interns (Martin, 1996; Sudzina et al., 1997). Leslie provided strong organization and structure, Forrest provided daily support and nurturing, Michael modeled and supported student-interest forms of science teaching, and Tamara provided structure and guidance for inquiry forms of teaching. Without special mentor training, each teacher's strengths in mentoring typically followed their temperament constructs and how they also interacted with students in the classroom (Hawkey, 1998; Martin, 1997; Rosenfeld & Rosenfeld, 2006). A cooperating teacher's pedagogical approach could also be the template for interns to model in learning to teach, whether self-imposed (Rose) or teacher-imposed (Bonnie). This result is not surprising considering that interns are novices in learning to teach, and modeling in authentic practice is a large part of this process (Author, 2005). However, only one intern, Mary, was completely satisfied with her cooperating teacher. Two interns, Rose and Nate, shared minor differences between personalities that impacted their ongoing relationship with their teacher but did not interfere with their ability to teach as they preferred. Bonnie was the exception who required our intervention, "[struggling] under the tyranny of [a] "good" teacher[s] who believed that there was only one way to do things..." (Sudzina et al., 1997, p. 32). In a perfect world, each cooperating teacher would equally express the spectrum of temperaments needed to mentor an intern in the science classroom (Bryce, 2002; Hayward, 2001; Kalil, 1998). In our study many such personality traits emerged that in-and-of themselves were beneficial for supporting a science intern (See Table IV). Only the blue color trait stands out as necessary for all actively supportive cooperating teachers.

Table IV

Beneficial character traits by color expressed in cooperating teachers.

<i>Temperament Color</i>	<i>Beneficial Traits for Science Mentoring</i>
Gold	Organization, structure, preparation
Blue	Active mentor, supporter, relationship
Green	Autonomy, collegiality, science knowledge, inquiry
Orange	Spontaneity, Real world issues, activities, fun

Blue Temperament for Mentoring

The blue trait in our study acted as the glue of moral support, active coaching, and daily supportive feedback (i.e., communication) that most interns require in this stage of their early development as teachers (Abell et al., 1995; Koerner & Rust, 2002; Knudson & Turley, 2000; Stanulis & Russell, 1999). Without a strong enough blue temperament, cooperating teachers in our study often remained aloof to the everyday support and

encouragement needed by interns as they experienced the difficulties and turmoil of learning to teach and manage students. Interns who especially need this moral support will feel isolated and alone in their placements, even feeling despondent about the many failures that they will experience in the learning process. Rose shared how she was older, more mature and so did not need Michael's everyday support, encouragement, and understanding, but that another intern may suffer without it. Bonnie also suffered from a teacher who was often oblivious to her personal difficulties and struggles. Both these cooperating teachers claimed to not be 'touchy-feely' people and also remained aloof with their students. They were hired to teach science and concern over individual student difficulties was not part of their job description.

Gold Temperament for Organized Instruction

In learning to teach, some modicum of gold temperament must also be present in the cooperating teacher, the intern, or both. Successfully teaching for targeted achievement gains in students requires some sense of sequential and organized instruction. Structure as evidenced through procedures and routines for managing the classroom is also important for beginning teachers to observe and practice. 'Winging it' may work for the experienced teacher whose plans and directions are implicit and based on experience, but this approach does not work for the novice. However, we have learned that this structure can be provided in part or whole by either party in the dyadic relationship. In a Vygotskian sense, if needed, the skills and abilities in structure and organization must be brought to the internship in a dissonant arrangement to spur intern learning; not a disparate arrangement (Elliot, 1995; Graham, 1993). Some interns may need to be stretched to learn some of these skills from their teacher (Croker, 1999; Hawkey, 1998). However, if two individuals are too disparate in this area, conflict and not learning may result.

Before this study framed our thinking, we anecdotally considered this aspect of temperament in making intern placements. We readily knew our students who needed a stronger hand in oversight in student teaching because they were not as independently organized and structured as we felt they needed to be to successfully plan, teach, and manage students every day. Nate in particular needed this organization and structure for success; a teacher who would model organization and gently work with him to achieve it. Of all the temperament styles that we studied, gold was the most critical for a successful learning experience for novice interns but was also most difficult to match properly. Some modicum of gold in each dyad was important in cultivating a respectful relationship where interns readily and willingly learned from their cooperating teacher (Abell et al., 1995). Too much imposed structure and control or too little structure and control by the cooperating teacher could both lead to an intern's lack of respect for a cooperating teacher. Bonnie claimed that she preferred someone just like her as a cooperating teacher, but Leslie likely provided too much control and organization to an intern who did not need it (McNally et al., 1997). Rose provided her own structure in planning what she wanted to do without any strong organization or structure to model from Michael. Nate received just the right amount of structure from Tamara, but not without complaint along the way. This dissonance in his relationship with Tamara

stretched him to grow in structure and organization, what he needed (Croker, 1999; Hawkey, 1998). What would have been the outcome of this internship if Tamara was too structured and controlling? Certainly more study is needed in the area of autonomy and control, structure and support in student teaching. The proper amount of scaffolding needed for each intern's practice is variable and a crucially important foundation for learning in student teaching.

Green Temperament for Inquiry

In learning to teach science as inquiry and motivating students to learn, these case studies have taught us that we cannot underestimate the need for green and orange temperaments in science teachers. Mentoring may require the underlying scaffolding of organization, structure, and moral support in successfully learning to plan, teach, and manage in the classroom. But to teach science as inquiry and carry out inspirational, novel, and motivational methods and projects to learn it is vital if science teachers are to meet the goals of national standards in practice (National Research Council, 1996). Michael and Tamara as cooperating teachers were constantly modeling inquiry forms of teaching, dialoguing on science and inquiry practice with their interns, challenging their own students' thinking in science, and seeing concrete experiences with science as an integral part of their classrooms. Also, these cooperating teachers almost immediately interacted with their interns professionally as colleagues, not apprentices; a desirable and competent position to obtain by the end of most internships (McNally et al., 1997). These particular traits were what endeared Rose and Nate to their cooperating teachers, despite their teachers' other shortcomings. A compatible philosophy or pedagogical orientation to teaching science formed the basis for establishing a strong respectful relationship within these dyads (Agee, 1996; Graham, 1997; Sudzina et al., 1997). If the goal for new science teachers is to teach science through inquiry, then all cooperating teachers in a science education program need to have some modicum of love of science learning and an inquiry orientation; what we have found as particularly green traits.

Orange Temperament for Spontaneity and Relevance

If the green temperament supports a love of science learning, knowledge, and support for teaching science as inquiry, then the orange temperament provides the innovation for implementing it in exciting and motivational ways. Inquiry is student-centered, phenomenon engaging (hands-on), focusing on student questions and interests in exploring and learning science. It can also be spontaneous in seizing the teachable moment, science in the news and in students' lives. Inquiry at its best can go off-script from a teacher's detailed lesson plan, following student leads and interest. All of these descriptions are typical of the fun, spontaneity, and risk-taking of the orange temperament (Bryce, 2002). Few science teachers in our program exhibit this temperament. Michael was the only cooperating teacher in this study who typified this description, and his intern thrived on this freedom and fun-loving attitude toward teaching science through inquiry. However, Rose was able to structure it for herself. Some modicum of these traits are desirable in science teachers if they are to move away from more traditional practices in the classroom to greater innovation that can spur

student motivation and learning. However, if too strong, as in Michael's case, this temperament may be too confusing for most interns who look for predictability and some sense of routine in their internship classroom. How a predominant orange personality type copes and stretches to become more organized and structured in their teaching would be an interesting further study. School systems often favor personality traits and characteristics in science teachers found in the other three personality colors, lessening diversity and opportunity for many students who are not motivated to learn through traditional approaches.

Implications for Intern Placements

The construct of personality temperaments and its impact on pedagogical preferences and mentoring during student teaching will continue to inform our thinking and practice in intern placements. Before this study we typically placed interns based on the availability of experienced cooperating teachers who were somewhat exemplary role models for intern practice. But we intuitively knew that this approach was not always successful for our interns who in the past could clash with a cooperating teacher with whom a previous intern thrived – In many of these cases almost leading to a failed internship (Harwood, Collins, & Sudzina, 2000). Our only consideration of temperaments was in providing structure for interns who needed it.

In addition, we have been re-sensitized to the literature on inquiry and pedagogical orientations based on prior experience (Crawford, 1999), and now, teaching and learning orientations that are correlated with temperament and learning styles (Pankratius, 1997; Rosenfeld & Rosenfeld, 2006). Being sensitized to the presence of green and orange temperaments will enable us to better value and cultivate those teachers in the crucial role of modeling science as inquiry with innovative ways of connecting science to students (NRC, 1996). Further research is needed in studying science teachers with inquiry and innovative orientations, how these orientations developed, and using this knowledge to potentially develop such orientations in future and current science teachers.

More importantly, for all of our cooperating teachers who do not express strong relational traits (blue), we need to provide professional development on mentoring so these teachers can begin to stretch into a temperament area in which they need to grow. Relational qualities such as communication, trust, and feedback will continue to remain vital components in any supportive internship experience (Stanulus & Russell, 2000).

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Appendix

Insight Personality Instrument©

Below are 10 questions and 4 answers for each question. Using the scale below, give a point value to each answer. Record that number on your answer sheet to reveal your color spectrum.

4 points	Always like me	(100% of the time)
3 points	Usually like me	(75% of the time)
2 points	Sometimes like me	(50% of the time)
1 point	Seldom like me	(25% of the time)
0 points	Never like me	(0% of the time)

1. Values

What words describe you?

- A. I am a kind, truthful, friendly, caring, artistic, peace-loving person. Feelings and relationships are very important to me.
- B. I am a trustworthy, obedient, polite, helpful, loyal, organized, goal-setting person. I respect rules, routines and traditions.
- C. I am a curious, scientific, logical, clever, calm, problem-solving person. I like to study and discover new things on my own.
- D. I am a friendly, energetic, playful, skillful, upbeat, risk-taking person. I need to be free to get up and go when I feel like it.

2. Motivation

Why do you do the things you do?

- A. I like to do thoughtful and kind things for other people. I try to make the world a nicer place to live in.
- B. I want to do things that are good and decent. I want to show that I am responsible. I want to be productive and successful.
- C. I think a lot. I like to experiment with my ideas and try to make them better. I want to prove that they are important.
- D. I like action and adventure. I like challenge and competition. I want to experience what life has to offer. I want to be the best.

3. Communication

How do you like to talk to other people?

- A. I like to talk and visit with my friends and family. I am a good listener. I show my feelings but do not like to argue or fight.
- B. I try to use correct and proper language when talking or writing. I sometimes sound bossy and old-fashioned to others.
- C. I like to talk about things that are important to me. I ask lots of questions to get to the important facts. I am fair and impartial.
- D. I am bold and like to say what is on my mind. I talk with energy and power. I am fun to talk with and like to joke around.

4. Work

What kind of work would you enjoy?

- A. I want a job where I can work with living things, like people, plants and animals. I also -like to do things that are creative, musical or artistic.
- B. I want a steady job where I can work hard and earn what I deserve. I always get the job done - even if I have to work overtime.
- C. I want a job where I can think of new and improved ways to do things. I can work 24 hours a day if the work is really stimulating.
- D. I want a job where I can show my talents and skills. I do not want to be tied down. I want immediate rewards for my hard work.

5. Supervision

What kind of leader are you?

- A. I am a true friend to the people I lead. I like to work side by side with them. I try to make sure they are happy and enjoy their jobs.
- B. I like to be in charge and help make the rules. I expect people to do their duty and work as hard as I do.
- C. I prefer to lead talented people who can work on their own. I welcome change and improvement. I keep my eye on the future.
- D. I am a go-getter leader who makes things happen. I do not like planning meetings and silly rules. I work best under pressure.

6. Recreation

What do you do when you want to have fun?

- A. When I want to have fun and relax, I like to do things with other people, particularly my family and close friends.
- B. When I finish my work and want to relax, I like to participate in structured and well-planned activities or sports.
- C. I like to keep my mind working even when I am supposed to relax. I have the most fun when I can learn or do new things.
- D. I love to play. I love to perform. I love to party. I enjoy physical contests, daring activities and challenging sports.

7. Childhood

What were you like as a child?

- A. I liked to pretend and had a good imagination. My pets were very important to me. If I won a contest, I always felt bad for the losers.
- B. I was an obedient child. I looked to my parents and teachers for direction. I was more grown-up than other kids. I did not like change.
- C. I asked lots of questions and liked to experiment and-figure things out for myself. I enjoyed reading, inventing and investigating.
- D. I was a noisy and fun-loving child. I was always on the go and full of life. I did not like rules and often got into trouble.

8. Youth

What were you like as a teenager?

- A. My friends were very important to me. I tried to include others in my group and tried very hard to get along. I was often the peacemaker.
- B. I enjoyed belonging to clubs and sports teams, being part of student government and working on school projects.
- C. I was very independent. I did not need friends to be happy. I set my own rules and standards. I focused on my hobbies and interests.
- D. I did a lot of wild and crazy things with my friends. I stayed close to the action. I pushed the limits and had a lot of fun.

9. Education

What subjects do you like to learn about?

- A. I prefer learning about subjects that focus on people: drama, creative writing, literature, music, languages, social studies and the arts.
- B. I prefer learning about traditional subjects: reading, writing, arithmetic, business, law, government, history and home economics.
- C. I prefer learning about subjects that focus on ideas: science, computers, engineering, drafting, mathematics and architecture.
- D. I prefer learning about subjects that focus on action: athletics, art, drama, dance, music, carpentry, ceramics and vocational skills.

10. Love

What do you expect from your relationships?

- A. I want to live happily ever after with someone who is loving, romantic and devoted. I give my heart and soul to my relationships.
- B. I want a traditional home life with a dedicated and dependable spouse. I show my love by doing my part and keeping my promises.
- C. My head rules my heart. I express feelings only - when necessary. I do not form relationships-unless it makes sense and fits into my lifestyle.
- D. I want a lover who enjoys my favorite activities and likes to explore new and exciting things together. I like lots of physical contact.

Answer Sheet

Use this form to record your answers. Using the scale below, give a point value to each answer. Record those numbers below. When you are finished, total up each vertical column.

- 4 points Always like me (100% of the
- 3 points Usually like me (75% of the time)
- 2 points Sometimes like me (50% of the time)
- 1 point Seldom like me (25% of the time)
- 0 points Never like me (0% of the time)

1. Values	A. ____	B. ____	C. ____	D. ____
2. Motivation	A. ____	B. ____	C. ____	D. ____
3. Communication	A. ____	B. ____	C. ____	D. ____
4. Work	A. ____	B. ____	C. ____	D. ____
5. Supervision	A. ____	B. ____	C. ____	D. ____
6. Recreation	A. ____	B. ____	C. ____	D. ____
7. Childhood	A. ____	B. ____	C. ____	D. ____
8. Youth	A. ____	B. ____	C. ____	D. ____
9. Education	A. ____	B. ____	C. ____	D. ____
10. Love	A. ____	B. ____	C. ____	D. ____
TOTALS	A.	B.	C.	D.