ADOLESCENT GEEK IDENTITY TRANSITIONS AND THEIR ROLE IN SHAPING CREATIVE BEHAVIOR

by

JEREMIAH PIÑA

(Under the Direction of Mark Runco)

ABSTRACT

The present study was designed to investigate the synthetic notion of adolescent Geek identity transitions, the origin of which were owed to prior ethnographic examinations of adolescent Geek cliques and culture (ie., Kinney, 1993; Bishop et al., 2003). Personal and support predictive characteristics of adolescents were evaluated, as the psychosocial context of identity expression had been shown to have an effect on identity transitions of this type (Burke & Stets, 2009). More so, as Geek culture in general has been considered a creative culture (Passlick, 2013; McCain, Gentile, & Campbell, 2015), and adolescent Geek culture in specific has been demonstrated to be similarly creatively facilitative (Blashki & Nichol, 2005; Hodges, 2011), constructs indicative of adolescent Geek identity transition were embedded in an amalgamated creative identity development framework by which the overall effect of the identity transition on creative behavior might be more fully assessed.

Responses to a researcher-generated online survey instrument of adolescent Geek identity transitions (the AGIT survey) were evaluated alongside responses to an extant measure of the quality and quantity of creative behaviors, the Creative Activities and Accomplishments Checklist (CAAC: Paek & Runco, 2017). In the main study, 131 adolescent participants (mean age 14.7 years) were recruited to complete both instruments. Findings supported the positions that (a) four developmental trajectories of adolescent Geek identity transition were most clearly expressed in the adolescent population, conceptualized here as the liminal, normalized, balanced, and embraced adolescent Geek identity

transition statuses, (b) two characteristics – academic performance and peer support -- most strongly predicted comparative membership among the four statuses, and (c) each of the three Geek-positive statuses demonstrated a unique signature of influence on the quality and quantity of creative behaviors, both generally and across three distinct creative domains, whereas, in contrast, the Geek-negative, liminal, transition status was more strongly associated with poorer quality and quantity of creative behaviors.

INDEX WORDS: Adolescent Geeks, Adolescent Creativity, Adolescent Identity Development, Creative Behavior Assessment, Creative Identity Development, Geek Studies

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DEDICATION

As with pretty much everything else in my life, I'd like to dedicate this work to my family, without whose steadfast support this could not have been possible. Thank you all so very much. I'd especially like to dedicate this work to Ester, who has not only stuck beside me these many long years, but who has also – in her own beautifully dark way – made my life a vibrant, full, and happy one. *We finally made it to the end!* I'd also like to offer my deep appreciation to Elrick, who, some years ago, I promised to thank in my dissertation if he helped me carry a rather large stack of books. Though, I was, of course, kidding (I was always going to thank you, in any case!), I still remembered and stood by my word, just as I know you always will in your life to come. *I am, and will always be, so proud of you.*

For you both:

All shapes are the same from the proper distance.
Everyone says so.
And the colors, too.

It gets to be the question, when asked enough,
of what *isn't*; wasn't *always*.

But it was on a sunny day,
full of shapes and sharp smells we met,
all that long ago.

And, for you, I ceaselessly recite
the names of those numb saturations.

For, when we eventually learn that everything in the world is
suffering, designed to break -- on our best and clearest days
together, we can recall:

Leaves on trees in the trailer park, and the musty airs
of rust on bent metal. Ears of dwarf corn hanging over the fence,
and a smile like life.

Don't you remember?

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Among the many people I'd like to acknowledge for their contributions to this work, the foremost thanks I can offer must go to my advisor and guide, Dr. Mark Runco. I don't think I'll ever be able to truly express my deep gratitude for your kindness and thoughtful aid.

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CHAPTER I

INTRODUCTION

This dissertation was a study of nerds. It was a study of dorks and dweebs, otaku and strebers, boffins, brains, and mels. It was, in accord with the heart-felt intentions of Kahler (2015), about *Geeks* and their *Geek culture*. My intention, however, was not to focus on the culture of the chic Geeks of modern days – not, in other words, the successful, pre-singularity prospects for the next generation of Silicon Valley – but instead to draw attention to the challenges of meekest and most vulnerable of the Geeks. The adolescent Geeks. Those young people whose lives are a perennially awkward, fluctuating mess and whose difficult, exalted, and angst-ridden social encounters will, someday, set the stage for their adulthoods.

This dissertation was also about those things that adolescent Geeks do in their culture. Their Geeky things. Their games, their writings, their art, their attempts at making music and digital media with one another – in other words, their *creative activities*. It was and is, for reasons that will be explored in some depth, generally the position of the study throughout that these Geeky creative activities are interrelated to the adolescent Geek identity. That, during adolescence, certain decisions a young person makes about the way they think about themselves relative to the concept of being a Geek – because of the influence of their peers, their families, or their environment – might, by altering their identity, affect their engagement in creative behaviors.

Indeed, it was in recognizing the transformative potential of these vicissitudes, amplified as they can be by the additional social burden of being labeled a Geek (Francis, 2009), that this, too, became a study which increasingly concerned itself with *adolescent identity transitions* – specifically, those of the

unique sort which involve the Geek identity. These are often characterized by changes in friendship groups (Bishop et al., 2003), in intrapersonal behaviors (Bosson, Weaver, & Prewitt-Freilino, 2012), and in the way in which the young person self-identifies (Stanton, 2014). And although they are a significant force in the lives of adolescents, such identity transitions are largely unheralded. They are sometimes even seen as being a normal part of outgrowing the childhood Geek persona (Anderegg, 2011).

Background of the Problem

The notion of the *adolescent Geek identity transition* was one which held a central place in the present study. Informally, it could be described as a process by which a young individual undertakes to define themselves in terms of how Geeky they believe themselves to be and how Geeky they want to appear to those around them.

For a concrete example, consider the story of William as it was told in Merten's (1996) ethnography: William was a young man who, very early on in his middle school experience, was labeled by his peers as being a 'mel'. This was their local term for Geek. At that time, and for about a year to follow, he wanted only to act in a way that he saw as being authentic to himself and his values. In his words:

> I act myself and I guess I do act girlish – faggie is what they call it. Why can't anyone act themselves in school? I'm a goodie-goodie. I want to be good. I want to be straight – I want to do good in my life. I don't want to be bad. (Merten, 1996, p. 16).

Unfortunately for William, the students at the school that he attended bullied mels with a relentless cruelty. A peer of William's, Becky, described one such incident that happened in William's seventh grade year:

> A lot of people make fun of him [William]. He is really nice to me. But sometimes I'm mean to him. One time it was really so nice of him… he took my punishment for me. Sitting in the seat all period. I didn't even thank him. I was spitting on him. I don't know why. I felt like it. He was really upset. He goes, 'Becky what have I done to you? I mean I even made up that time for you in art.' I told him that I was sorry and I spit on him again. (Merten, 1996, p. 19).

Responding to the harassment of his peers, William sought opportunities to alter the way in which he was perceived by others. He distanced himself from his other mel friends, compromised his values, and started getting into fights with other students (Merten, 1996, p. 16). Ultimately, by the end of eighth grade, William was successful. Having decided to sever ties with his Geeky origins, he was rewarded by his peers with acknowledgement and respect. As he put it:

> I mean I have everything I want. I am accepted by every single person in my classroom. No troubles at all. At the beginning of the year, I was worried about nobody liking me and now everybody likes me… I would say I'm in the top 10. I mean everything has changed. I know it's the best I've ever felt in my life. (Merten, 1996, p. 21).

This narrative of moving from a Geek identity to a less stigmatized identity – sometimes referred to as the normalizing process (Gabriel, 2015) – is relatively well-known among researchers who study adolescent development. Kinney (1993) investigated it in depth, and thought of it as, on the whole, a fairly positive act of personal growth.

Yet, this trajectory is not the only one depicted in the literature. Alongside normalizing are other developmental pathways that have been less often reported. One such example can be found in the stories of the members of "Random Reigns Supreme," an "anti-club" discussed in the work of Bucholtz (1999). In this case, rather than abandon the stigmatized Geek identity, the adolescent students in the study had instead banded together in order to "celebrate their own preferences, from Sesame Street to

cows to Mr. Salty the pretzel man." (1999, p. 214). In conscious opposition to the ideologies of other crowds, members of Random Reigns Supreme placed considerable value in intelligence, knowledgeability, and creative wordplay – often engaging in mock debates and imaginative discourse about oddball topics (1999, pp. 215-217).

In addition to these accounts, there are a small number of other variant developmental pathways of adolescent Geek identity transition to be found in the ethnographic literature (see Currie, Kelly, & Pomerantz, 2006; Francis, Skelton, & Read, 2010 for more examples), each falling somewhere between the extremes of a complete disassociation with the Geek identity to a defiant embrace of all things Geeky. These studies, taken together, suggest that multiple developmental outcomes can occur as a result of an adolescent Geek identity transition.

What these studies cannot, by themselves, tell us is what might be the personal ramifications of undergoing these identity transitions, nor, to a larger extent, what might weight a trajectory such that it becomes more viable. Would William have chosen to continue to identify as a Geek if he had the company of more friends like him? Could the support of a parent have changed his mind? These questions raised in the ethnographic study of adolescent Geeks have posed questions that, without further investigation, could not be answered, except by speculation.

There are hints, though, that real stakes might exist in the consequences of the transition of Geek identities – that something meaningful can be gained or lost. Among the many positive qualities of the Geek identity, a tendency to engage in creative behavior is pervasive among adults (Mizer, 2013; Passlick, 2013) and adolescents (Blashki & Nichol, 2005; Hodges, 2011). This implies that, as with academic performance (cf., Archer et al., 2012; Mendick & Francis, 2012; Chau, 2014), it is possible that increasing or decreasing association with the adolescent Geek identity may serve to differentiate the expression of creative behavior.

In other words, adolescent Geek identity transitions may function as a medium for variant forms of the *development of creative behavior* in a manner not unlike that posed by Albert (1992), whereby creative enrichment is an intentional, agentive process of continually responding to environmental and personal organizers. As identity transitions may serve to organize both an individual's self-perception, and, as a consequence, behaviors most salient to an individual's understanding of the identity (Stets & Serpe, 2013), it is arguable that adolescent Geek identity transitions might, themselves, serve to organize creative behavior, such that *creative identity development* results. This is more directly observed in Petkus's (1996) model, which postulated a positive feedback relationship among support, role-identity, and creativity, wherein, as an identity containing creativity as a symbolic trait is more fully developed, so too is creative behavior more often expressed.

The challenge going forward into this study was to both thoughtfully investigate the diversity of adolescent Geek identity transitions, and to position these transitions in a framework – a composite theoretical model – by which their potential to influence creative behavior might better be determined. Here, a qualitative approach, which would have provided just one more inductive vantage among the many that had been posed earlier, would not suffice; rather, the alternative work of carefully operationalizing for deductive assessment was undertaken, such that any theory promoted in the study would have a deep empirical basis upon which clearer insights about the organization and prevalence of adolescent Geek identity transitions might be drawn, both at the present time and in the future.

Purpose of the Study

A number of ethnographic studies (ie., Bishop et al., 2003; Parker, 2013) concerning the social context of young adolescents have found that Geeks occupy a challenging place in the hierarchy of adolescent peer crowds. For this reason, it has been put forward that Geeks experience various forms of

identity transition during this period (cf., Kinney, 1993; Gabriel, 2015) as they seek to modify their identities in an effort to negotiate their complex social environment.

As the Geek culture in general, and Geeks as participants therein, have been consistently described as creative (cf., Konzack, 2006; Mizer, 2013; Passlick, 2013; McCain, Gentile, & Campbell, 2015), it bears consideration that the identity transitions that adolescent Geeks undergo may influence their expressions of creative behavior in a manner corresponding to the underlying logic of the identity theoretic perspective: That, as Mead (1934) put it, "society shapes self shapes social behavior."

This confluence of identity-centric insights promotes the amalgamation of a composite model based in the shared frameworks of identity theory (as in Stets & Serpe, 2013), social identity theory (as in Hogg, 2016), and a theory of creative identity development (Petkus, 1996) whereby the influence of adolescent social and role identity transitions, their support-based contextual predictors, and their influence on creative activity engagement and accomplishment can be examined.

Three research questions will be explored in this study:

1. What is the nature of adolescent Geek identity transitions?
2. What are the personal and support predictors of adolescent Geek identity transitions?
3. To what extent do adolescent Geek identity transitions influence expressions of creative behavior?

Significance of the Study

It was my intention that this dissertation study would make contributions in a number of distinct areas in our current understanding: First and foremost, this work was reflective of an effort to highlight creativity as being among, as Mendick & Francis (2012) have called them, the "geek capitals", such that creativity can be more clearly seen outside of the Geek culture as a strength of the Geek identity.

Whereas social images of Geeks often include stereotypical conceptualizations of the Geek as a "genius" or an "enthusiast" (Tocci, 2009), meaningful representations of the playfulness, boundless imagination, and creative vigor demonstrated by members of the Geek culture are largely absent. Learning more about the inherent creativity of the Geek identity is, therefore, a step in the direction of legitimizing expressions of Geeky enthusiasm as a basis for creative development.

A second type of contribution was meant to be made in providing a means by which to augment the practical repertoire of educators who wish to support adolescent students who identify as Geeks. At present, although it appears to be widely understood that adolescent peer crowds are a ubiquitous feature of educational settings (Garner, Bootcheck, Lorr, & Rauch, 2006), there is a lingering sense that educators have thus far treated the experience of being an adolescent Geek as something of a trivial matter. This may, in part, be because the challenges of Geeks are obscured by the fact that they are often high-achieving students (Francis, Skelton, & Read, 2012) who want to make their teachers happy (Anderegg, 2007).

Giving attention to creativity was an effort to bring to light that Geeky students have desires apart from strong performance in the classroom, and, furthermore, that creativity can be a powerful medium by which to connect to these students' social and emotional needs (Hébert, 2011). In practice, this can lead to the refinement of techniques for educators that can better facilitate the creativity and achievement of Geeky students.

Finally, it was hoped that this work would entail a contribution to the study of creative identity development in general. As a topic, identity is, at present, underrepresented in creativity research (Glaveanu & Tanggard, 2014), and so a basic goal of this work was to add to the empirical canon of the study of creative identity. More directly, a significant motivational impetus for this dissertation was an effort to break away from a trend in this area of confining the creative identity to corporate and organizational environments (see Tierney, 2015 for a review). As such, it was my goal to extend models

of creative identity into other social contexts, like that of the educational setting, such that the creativity of various identities may be better understood outside the workplace.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this study was to investigate adolescent Geeks' identity transitions, contextual influences on the identity transition, and their potential influence on the expression of adolescents' creative behaviors. The questions that guided the study concerned: (a) the nature of adolescent Geek identity transitions, (b) the personal and support-based predictors of adolescent Geek identity transitions, and (c) the extent to which adolescent Geek identity transitions may affect creative activity and achievement.

This review of literature establishes the general framework for the study by exploring relevant topics in the study of *Geek culture* and the specific case of identity development found in the study of the *identity transitions of adolescent Geeks*. It then follows with sections detailing *theories of adolescent identity transition* and *theories of creative identity development*. Throughout this chapter, a composite model of creative identity development based on the ethnographic findings of areas within the study of Geek culture is proposed utilizing the unique conditions of adolescent Geek identity transitions as a means by which to evaluate their role as facilitators of creative behavior.

Geek Culture

At the surface level, the concept of the Geek is relatively easy to access in our modern culture, being neither especially obscure nor ambiguous. Stereotypical Geeks are staples on television shows and fixtures in movies (Anderegg, 2007), with a tendency to be associated with broad range of characteristics such as studiousness, intelligence, shyness, and unpopularity (see *Appendix D* for

thorough, but by no means comprehensive, summary). However, although it might be argued that the common, unrefined notion of the Geek is abundant, this is not to imply that the experiences of individuals living within the boundaries of the Geek culture are yet well-mapped by empirical study.

Indeed, in the nascent field of Geek studies, there have, to date, been only a small handful of such investigations. Among these few was the landmark work of McCain, Gentile, & Campbell (2015), which consisted of a series of seven studies intended to determine the psychological characteristics of participants in Geek culture venues. Reflective of the fractured and unbuilt nature of the Geek studies as they currently stand, McCain et al. (2015) did not propose a single cohesive hypothesis by which the rationale for participation in Geek activities could be examined, but instead offered three variant accounts which they termed the (a) Great Fantasy Migration Hypothesis, the (b) Belongingness Hypothesis, and the (c) Engagement Hypothesis.

Regarding the three participation hypotheses available in McCain et al. (2015), it is worthy to consider that the second and third hold an unusual and not wholly exclusive relationship: for, although a belongingness hypothesis emphasizes an implicit Geek social identity and an engagement hypothesis instead highlights an activity-based interaction, both together interrelate in that they engender a performative social medium through which participants both *are* and *do* Geek. In fact, it may be argued that the division between the two is arbitrary, especially for the reasons that Geek communities share an identity based on their activities (Passlick, 2013) and, equally, that engaging in certain Geek activities appears to define a unique place within Geek communities (Lotecki, 2012).

However, for rhetorical purposes, it has largely been the case that authors have approached the Geek culture as a specific type of identity or as a category of action. The former is clearly the case in works like that of Tocci (2009), whose influential ethnography described not one fixed Geek cultural identity, but rather found four loosely associated cultural views of the Geek: Identified as *misfit*, as

genius, as *enthusiast*, and, more recently, as *chic*. Across all four contexts, Tocci argued that a common trait was a sense of "collective identity" that the author formulated following a usage similar to that of Anderson (1983) which equated identification with the "imagined community" of a Geek culture to a certain understanding of individuals' feelings of nationalism (2009, pp. 74-79).

Essentially, it seems that, when one unpacks the logic of Tocci (2009) and that of other, similar researchers, there is articulated both an ideal Geek community and a set of values – a *Geek ethos*, for lack of a better term – to which avid participants in the Geek culture belong. These elements can be seen not only in later studies of the Geek identity directly (both Claassen, 2015 and Gabriel, 2015 touch on these issues), but in other, related research as well. Woo's (2012) field study, for instance, described the embodiment of an ideal Geek community as being one mediated by thoughtful cultural coordinators, "alpha nerds", who curated spaces for participant Geeks. Likewise, the Geek convention scene, or "con scene", can be viewed as another such communal idealization – a place where Geeks can both maintain their otherness and enjoy the ludic benefits of togetherness in a facilitative environment (see Brehm-Heeger, Conway, & Vale, 2007 and Kahler, 2015 for discussion).

More complicated are topics appertaining to the Geek ethos, which include among them a troubling question of whether the shared values of Geeks are, on the whole, a positive or negative force in Geek communities. With regard to this issue, there is an ongoing discourse, most especially within the technological and scientific sectors of the Geek culture, concerning the extent to which normative forces within the culture act to uphold restrictive cultural values, such as the promulgation of hegemonic masculinity (Kendall, 2000) and racial disparities (Eglash, 2002). And, as the traditional stereotype of the Geek is a white male (Kendall, 2011), there is an argument that these "policing" (Reagle, 2015) or other gatekeeping activities within the Geek culture may represent a broader ideological opposition to the growing place of women and minorities in science and technology-related fields (Varma, 2007).

At the same time, though, there are values within the Geek ethos that are generally uncontroversial, benign, and, in the simplest sense, positive: These include a cultural emphasis on expressing deep enthusiasm (Passlick, 2013), passion (Bray, 2014), and creativity (Nichol & Blashki, 2006). In reference to these perceived positive traits, Kelly (1998), quite early on, declared the Geek culture an instantiation of C.P. Snow's (1964) concept of the "third culture", which Kelly idealized as valuing technology, scientific advancement, creation, innovation, and novelty as means to "truth and experience" (1998, p. 992).

Here, the positive aspects of the Geek ethos serve in an unexpected way. They not only characterize the ideals of Geek communities, they also subtly bridge belongingness and engagement elements in the study of Geek culture. This is for the reason that, when tasked with the question of why Geeks undertake certain activities, the answers, more often than not, reference one or more of these enumerated values. For example, in Geek communities that modify video games, there is a strong sense that personal enthusiasm for the activity is an integral driving force for the work (Camper, 2002), which is especially important as these communities are not often well-funded, and, in fact, usually make their contributions for free (Kuklich, 2005).

Such enthusiasm is also readily visible in fan writing communities wherein unofficial writing derived from an established setting or intellectual property, "fan fiction" (see Wolf, 2014 for a discussion), is carried out. Referring to this emotive power and dedication of this community, Hodges (2011) provided the following thoughtful assertion:

> To identify oneself as a fan is to assert both enthusiasm and expertise. It's intriguing to think that, in an ideal world, English teachers would identify themselves as "fans" of the text and writing they share with students (p. 5).

Similarly, with regard to the emotional effect of passionate engagement with Geeky activities, Manifold (2009) meaningfully invoked the theory of affective semiotics to describe the depth and significance of connection of fan artists and costume players, or 'cosplayers', with the fictional subjects of their works. As she put it:

> Art making, as engagement with the fantasies of popular culture, assists identity development, permits expression, exploration, and enactment of ways of being in the world, and connects the fan participant to ideas beyond personal and local cultural parameters (p. 268).

But, perhaps to a greater degree than with either the Geeky virtues of passion and enthusiasm, it is in a desire for creative engagement that the propellant which motivates the nucleation of a Geek-centric communal identity is most directly identified. To many self-described Geeks, creativity is a touchstone for both participation in Geeky activities and identification as a Geek. Returning to the work of Tocci (2009), it was a theme in his ethnography that self-identified Geeks symbolized their involvement in the culture as being, in some sense, a manifestation of their creativity; or, as he summarized, "Nerds tell a story of themselves as being smart, creative, playful, stigmatized, but worthy of rescue (or even 'revenge')" (2009, p. 76).

Mizer (2013) intensified this notion of the creativity of Geeks by drawing on the growing prominence of members of the Geek culture, represented in the literature of various authors, as exemplars of consumers who create. This position was centrally embedded in Mizer's definition of Geeks, which he formulated as "individuals who bond with one another over a shared exuberance for creative consumption of their cultural interests" (2013, p. 6). Further, Mizer (2013) described this process of creative consumption as an articulation of a number of diverse "strategies and tactics" (2013, p. 7) whereby Geeks interacted with, and innovated in, the symbolic worlds of their cultural interests through imagination, digital communication, and collective action.

In a similar way, Konzack (2006) argued that the common thread among Geeky activities is that they were creative acts inspired by an abundance of Geeky enthusiasm. In his words:

> Geeks are incredibly creative minded. They like to contribute artistically to the geek culture, not just consuming it. The geeks don't just read comics, but they make their own drawings as well. The geeks are not just playing games, but try to make game content too. (2006, pp. 6 - 7).

This dovetails with the position of Wang who, in his (2013) study of Chinese "*Ke* cultures," contended that Geeks, or "*Jike"*, constituted a "creative class," much like Bohemians, forming a subculture of productive enthusiasts who "live in an unconventional life style" (p. 7).

Likewise, it is a perspective held across the research endeavors of Blashki & Nichol (2005) and Nichol, Blashki, and Goward (2006) which, in the first study, investigated the development of 'leet speak' – a semi-serious form of digital communication utilizing non-standard characters and word-forms – as a creative activity of online Geek communities, and, in the second study, emphasized the role of Geek communities as creative environments. Furthermore, across their qualitative study of the creative environment of gaming Geeks (refer to both Nichol & Blashki 2006 and Nichol, Blashki, & Goward, 2006 for a full discussion), the authors investigated their value as "creative support systems" (Nichol, Blashki, & Goward, 2006, pp. 3-4), arguing that among the various creative environments in which gaming Geeks were immersed, the role of "play/humor and idea/support time" (2006, p. 6) served to augment the creative engagement of their Geeky participants.

More broadly, McCain et al. (2015) have collected empirical evidence to demonstrate that engagement in the Geek culture and identification as a Geek both share strong relationships with creativity. They found that participants who scored highly on both their "geek engagement scale" and their "geek identity scale" tended to score more highly on a variety of creativity assessments, with the strongest statistically significant findings being correlations with creative ideation (2015, p. 28). As such,

the inferences they later drew about the role of creativity in the Geek culture were unambiguous: “Of the variables tested, geek engagement appears to be predicted primarily through creativity and its correlates” (2015, p. 31).

And so, to offer a summary of contributions of the broad literature of Geek studies to the current dissertation, it may be most useful to illuminate the overall themes that are developing in the field as it continues to grow: First, that Geeks occupy a distinct social context composed of communities, real and imagined, whose characteristics are not yet fully explored; second, that groups of Geeks create and share their spaces, at least to some extent, in the pursuit of Geeky activities and in line with social values concordant with a Geek ethos; and third, that certain positive values within the ethos – enthusiasm, passion, and creativity – serve a special role as focal points for both the development of Geek culture and for continual engagement in Geeky activities. Of the three positive values, the need to express creativity, and especially to engage creatively with a topic of personal interest, appears to be the most prominent, as it is most consistently demonstrated across the many variations of participation in the Geek culture.

Drawing from these insights, it became an issue of particular interest of mine to attend to those questions – posed, but unanswered – that connect creativity to the Geek culture: What is the potential contribution of identifying as a Geek to the development of creative behavior? In what ways does this express itself in variant instantiations of the imagined communities that populate the Geek culture? Do the contexts in which these communities are embedded influence how these Geek identities manifest? And, most importantly, to what extent can it be confirmed that this culture can serve as a medium for refining our understanding of the way in which identities of any sort might affect aspects of creativity?

These questions together served as a starting point for further investigations of *adolescent Geek culture* and the manner by which the Geek cultural identity can be either adopted or discarded by young

people at that critical point in their development. It is these topics which will be expounded upon more completely in the sections to follow.

However, before moving on, there is a last, brief aside necessary to tie up a single loose end: Eagle-eyed readers may be wondering about the importance of the first of McCain et al.'s (2015) three hypotheses for engagement in Geek activities, the "Great Fantasy Migration Hypothesis."

This was deliberately left vague for the reason that the body of literature engendered by the hypothesis largely concerned connections between the Geek culture and abnormal psychology, specifically to personality traits like narcissism, neuroticism, and depression (McCain et al., 2015, pp. 31-32). As this study was not intended to address this strand of research, nothing beyond an early mention in the literature review was given; however, in recognition of the possibility of the confounding influence of abnormality in the psychologies of Geeks on variables of interest, this hypothesis is discussed in a later section of the methodology of the study. (See *Limitations of the Study* for more.)

Identity Transitions of Adolescent Geeks

Adolescence has long been considered to be a period of intense personal growth and social exploration in the lives of young people (Steinberg & Morris, 2001). A natural corollary of this condition is that peer groups in the shared social environments of adolescence gain ascendency in the hearts and minds of adolescent youth, such that peer crowd participation becomes increasingly salient throughout adolescence (Rubin, Bukowski, & Parker, 2006). As these peer crowds tend to be reputational in nature, joining and being recognized by peer crowds with the highest status becomes an important aspiration of many young people (Stone & Brown, 1999).

These circumstances bear unfortunate implications for young individuals who would describe themselves as Geeks. In the sociological study of adolescent peer crowds and peer crowd hierarchies,

Geeks have been consistently demonstrated to occupy the lower echelons of the many student crowds which comprise educational contexts (cf., Urberg, Degirmencioglu, Tolson, & Halliday-Scher, 2000; Brady, 2004; Rentzsch, Schutz, & Schroeder-Abe, 2011). Indeed, Geek crowds are sometimes known for their habit of being in opposition to the highest-status crowds (Bucholtz, 1999). As a result, adolescent Geeks are often negatively stereotyped by their peers as being "overambitious", "having few friends", and "not being physically attractive" (Rentzsch, Schroeder-Abe, & Schutz, 2013). As such, in general, the adolescent Geek identity is thought to confer a fairly burdensome stigma to students who bear the label (Striley, 2014).

It is within this context that the concept of the adolescent Geek is best understood. Although exponents of the Geek culture at large have argued the virtues of the 'Geek chic' movement (Tocci, 2007) and have suggested an attendant rise in positive regard for Geeks in the mainstream culture (Dunbar-Hester, 2014), it remains clear that these changes have yet to fully penetrate into the daily experiences of young people (see Mendick & Francis, 2012 for a discussion). This means that the adolescent Geek identity still bears a significant stigma, as young Geeks continue to endure bullying and harassment (Thornberg, 2015), and association with the Geek identity itself is still used as a means of censure for students who do not conform to the norms enforced by their peers (Raby & Pomerantz, 2015).

These sentiments are perhaps most strongly felt in the writings of Bishop et al. (2003) and Bishop et al. (2004) who together strongly argued the position that the normative force of student peer cultures and the pressures of trend-setters in high status crowds worked explicitly to inculcate an ethos of anti-scholasticism by means of social censure, harassment, and scorn aimed at Geeky students who valued academic achievement and had odd, nonconformists interests. As they put it:

> The oppression that nerds experience sends powerful normative signals to other students in the school to withdraw from alliances with teachers and get with the program of becoming popular with peers. "Be like us," the Populars say. Spend your time socializing, do not "study too hard." Value classmates for their athletic prowess and their attractiveness, not their interest in history or their accomplishments in science. (Bishop et al., 2003, pp. 181 – 182).

Moreover, both the Bishop et al. (2003) and Bishop et al. (2004) ethnographies make reference to a phenomenon that goes back generations – being evinced clearly as far back as 1960 in Tannenbaum's (1960, 1962) studies – whereby the attitudes of the peers and parents of high-achieving students were found to be generally negative toward the Geeky high-achievers, even to the point of rejection (Colangelo & Kelly, 1983). Further research along these lines has conceptualized this "Stigma of Giftedness" (as in Coleman, 1985) as being a significant challenge for gifted students, and one for which a variety of coping strategies may be employed across various social situations (Cross, Coleman, & Terhaar-Yonkers, 1991).

Given these intense, negative social pressures, it should come as no surprise that, in the long-run, adolescent Geeks often seek to divorce themselves from their studious, high-achieving origins and recast themselves as members of other social orders. This process, sometimes referred to as *normalizing* (Gabriel, 2015), was first explored by Kinney in his (1993) study of adolescent social transitions. Kinney ascertained that middle school students labeled as Geeks, dissatisfied with their negative peer interactions, would respond to the ascribed status in high school in one of two ways: Either Geeky students would undergo active conformation to the ideals and behaviors of their high-status peers, or they could emancipate themselves from the expectations of others (1993, p. 33). In either sense, this process has been also regarded as a facet of "outgrowing" the Geek identity (Gabriel, 2015, p. 22), as it occurs in a protracted manner throughout the school careers of adolescents and has been taken to be a consequence of a naturally maturing perspective.

Bishop et al. (2003) discussed a similar effect in the development of peer crowds in middle schools with regard to early "crowd assignment," (2003, pp. 148-149) wherein new students were rapidly evaluated by their peers and associated with reputational groups. For students in the Geek crowd, which was again found to be among the lowest in the crowd hierarchy of the schools sampled by the study (2003, p. 151), there was a tension in either accepting the peer crowd assignment or, more often, in escaping it (2003, p. 149). This was explicitly noted as being a costly and difficult endeavor, as high-status crowds often had rigorous standards that had to be met in order to qualify for entry and almost always required the applicant to distance themselves from friends in other crowds to better conform to the norms of the new group (2003, p. 150).

Enriching this overall narrative of normalization, however, were instances wherein researchers have found that students will sometimes refuse to relinquish the Geek crowd identity in defiance of the mainstream obsession with popularity and social advancement. Bucholtz (1999; 2011) detailed one such case as it applied to roughly half a dozen participants in her study. She characterized these students as being non-conformists who rejected, through many activities and personal expressions, the hegemonic social order promulgated by their more popular peers (2011, p. 140). This was a somewhat embattled position for students who understood that their Geek status set them apart from others and who, as a result, found themselves navigating interactions by downplaying their differences in certain social settings (2011, pp. 144 – 145).

Later, Francis, Read, and Skelton (2012) found in their study of the identities of high-achieving secondary school students that the majority of students labeled as "boffins" or "swots," as Geeks were referred to in their study, were actually faced with multiple options. They could either (a) work to escape the identity by embracing sociability, (b) find a way to balance their achievement and social capitals, or (c) claim, with some difficulty, the imputed identity. Here again the act of shedding the Geek crowd identity was not thought to be easy. As they outlined the process for students who chose that

developmental pathway, Francis, Skelton, and Read invoked the concept of the *parvenu*, signifying students' "struggle to be accepted by dominant groups, always at risk of being revealed as inauthentic and reinscribed with the feared status of the pariah" (2012, p. 95). Notably, and in spite of the challenge, their study indicated that students who could successfully "balance" their social identity were, in many ways, in the best position, finding that a number of these students were judged to be "alphas" by their peers (Francis, Skelton, & Read, 2010, p. 321).

The research team of Archer, DeWitt, Osborne, Dillon, Willis, and Wong further elaborated the prospects of balancing and embracing the Geek identity in their (2012) interview study of the identities of adolescent young women relating to postcompulsory academic involvement in science, technology, engineering, and math (STEM) fields. Through discourse with a group of nearly 100 science-aspirant students and their parents, Archer et al. (2012) discovered that, before the age of 12, the majority of young women had grown disinterested in pursuing STEM careers especially for the reason that they associated such jobs with "masculinity" and "cleverness" (2012, pp. 973-974). These characteristics, when taken together, described a science-oriented Geek identity which was directly at odds with the identity performances of normal heterofemininity. As a result, young women who had an interest in STEM areas found themselves pressured to either balance their science interests with sociability in the archetype of "feminine scientists" (2012, pp. 974-978) or pursue their Geeky interests at the cost of social standing in the manner of "bluestocking scientists", being in the latter case defined by their "non-girly" and non-"popular" science-aspirational identity (2012, pp. 978-982).

In synthesis, this body of ethnographic literature has illustrated an unusually significant aspect of these adolescent social changes: That, from a common starting point, there were a number of paths that a young person might take as they developed their identity relative to the idea of being a Geek, and that each permutation may have diversely influenced the future growth of the individual, both with

respect to topics pertinent to the Geek identity, such as participation in certain playful activities, and more generally, such as a decision to (not) participate in academics.

Borrowing from the language and logic of developmental psychopathology (cf., Cicchetti & Rogosch, 2002; Nolan-Hoeksema & Watkins, 2011), it could further be said that young people undergoing these adolescent Geek identity transitions have experienced divergent *developmental trajectories* which were *multifinal* in character. In other words, going through an adolescent Geek identity transition may, at base, be thought of as a developmental pathway with many branches, defined by decisions in adolescence, resulting in enduring changes to the individual. It was Crockett and Crouter (1995) who, perhaps better than anyone, captured the deep significance of these multiple developmental pathways to the personal growth of teenagers when they stated:

> Although turning points occur throughout life, they may be concentrated in particular developmental periods. […] Adolescence holds a number of potentially critical decision points concerning lifestyle and future roles; thus, the branching of the developmental path appears to be particularly dense during this period. Moreover, adolescents have a greater capacity than younger children to select the direction they follow at each fork in the road, and the choices they make have a greater influence on the subsequent life course than those of earlier periods. (1995, p. 4).

Concerning Geek identity development, these observations about the transitions of adolescent Geeks highlighted that the decisions of young people – to remain with, abandon, or attempt to balance the Geek identity – entangled adolescents' social identities, personal identities, self-aspirations, and activity engagements in a complex manner, such that a multiplicity of potentially life-altering consequences could be set into motion as the young person navigates their feelings about the Geek identity and the symbolic links it has to topics like science, technology, and academic achievement.

Following these insights, then, with regard to conceptualizing the plurality of developmental pathways of adolescent Geek identity transitions, the notion was, in the roughest sense, operationalized as a process of personal and social interaction between previous and current Geek self-identification wherein four variant outcomes have been thus far established in the literature. (See Figure 1, below).

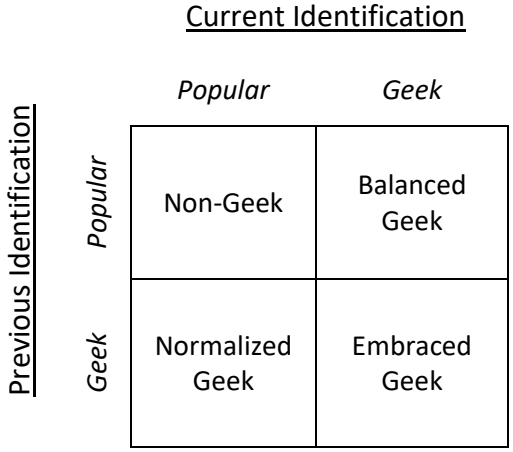

Figure 1

Conceptual summary of adolescent Geek identity transitions

What quickly materialized as a consequence of developing this conceptual summary was a challenge in determining a manner by which these identity transitions may be empirically captured, and, further, in determining the effects these changes might have on areas salient to adolescents as they re-orient themselves against the idea of being a Geek. This proved more difficult than it seemed at first: Efforts to disentangle identity characteristics were found to, by necessity, not only entail attending to the significance of the peer crowd identity change that occurred during the identity transition, but they also had to adequately address the larger issue of the extent to which these transitions affected the manner by which a young Geek, or former Geek, defined themselves in terms of the traits of the Geek identity as they understood it. Modelling these interactions required seeking out and applying a theoretical perspective which could deductively encapsulate what had been, up until this time, a largely inductive process of investigation.

Theories of Adolescent Identity Transition

Working from the body of literature that constituted the broad area of Geek studies – as well as the more particularized strand of adolescent Geek identity transitions contained within it – had created, in the earliest stages of the development of this dissertation study, an interesting challenge with regard to the cornucopia of theoretical stances represented therein. That is to say, given the nature and condition of academic study in this area, the notion of the Geek at any developmental phase and in any context has tended to be either (a) conceptualized without much emphasis being afforded to a larger theoretical framework, or (b) theoretically embedded in diverse perspectives that can be difficult to reconcile.

For this reason, it was deemed necessary to review an array of related literature in areas of adolescent and developmental psychology as a means of either adapting or amalgamating a theoretical framework serving both the needs of parameterizing a synthetic construct of Geek identity transitions – as they had been detailed individually and not as variants of a single developmental process in previous ethnographic studies of adolescent Geeks – and, additionally, of modeling a relationship among adolescents' social contexts and Geek identities that could be utilized in a systematic study of their hypothetically interdependent co-expression.

Although, ultimately, this teleological approach fostered some theoretical eclecticism, there were found to be a small number of perspectives – most especially those of identity theory (IT) and social identity theory (SIT) – that were directly influential to the present study in that they provided conceptual structure for important notions pertinent to the development of the construct of adolescent Geek identity transitions. Specifically, it was from IT that the concept of adolescent Geek *role identity development* was drawn, and it was in the framework of SIT that adolescent Geek *crowd identity transition* was established.

Framing adolescent Geek identity transitions relative to the notion of role identity as it exists in IT literature benefitted the study by providing a vantage by which the circumstantially contextual personal identity could be more deeply explored; in essence, serving as a proxy for an internal position of the adolescent self-concept. In this perspective, the underlying nature of identity expression is conceptualized as a process by which the full, unknowable identity of a person – the *self* – maintains a fluid, reciprocal relationship with society, giving rise to quantifiable situational identities defined by the social milieu in which they occur (Burke & Tully, 1977). As Stets and Burke (2000) described it:

> One has an identity, an "internalized positional designation" (Stryker, 1980, p. 60), for each of the different positions or role relationships the person holds in society. Thus, self as a father is an identity, as is self as colleague, self as friend, and self as any of the other myriad possibilities corresponding to the various roles one may play. The identities are the meanings one has as a group member, as a role-holder, or as a person. (2000, p. 8).

Thus, role identities are, as Hogg, Terry, and White have further elaborated, "self-conceptions, self-referent cognitions, or self-definitions that people apply to themselves as a consequence of the structural role positions they occupy" (1995, p. 256).

A consequence of this dynamic formulation of the identity is that individuals are expected to express multiple role identities based on their environment. These are thought to be ordered according to their likelihood to be invoked – a concept referred to as the *salience* of the identity (Stryker & Burke, 2000) – in *salience hierarchies* (Stryker, 1980) which, in some sense, determine their relative utility and value to the individual. As individuals are constantly receiving feedback from others in their environment, either supporting or critiquing the performance of a role identity (Burke & Stets, 2009), the sustainment of the salience of a role identity can be likened to a metabolic process, whereby

equilibrium is sought between the person and the environment such that homeostatic feedback is most often received.

Situating centrally the idea that salient identities will enjoin equilibrium in the social environment wherein they are most often expressed, the identity-verification model (Burke & Stets, 2009; Stets & Serpe, 2013; Burke & Stets, 2014a) postulates that comparisons in the environment will influence behavior in line with a role identity to the extent that they positively reinforce a self-referencing set of symbolic meanings composing the *identity standard* of an individual's role. On the other hand, disequilibrium in the interactions between a context and a role identity will interrupt the process of identity-verification, resulting in "distress" (Burke & Stets, 2009, p. 76) and "negative emotions" (Stets & Burke, 2014a, p. 4), which can bring about readjustments in the system and, eventually, long term identity changes (Stets & Burke, 2014b, pp. 75-78).

This briefly touches to the topic contextual supports – those coming from peers, family, and other salient individuals – that might promote a stable equilibrium. Following IT, these have tended to be fairly strictly interpreted in terms of their role as contextual *resources* by which meanings of an identity are extended beyond their symbolic weight to be considered as sign negotiations that are direct experiences correlating an individual's reactions to the way, as Stets and Burke put it, "they 'should' be" (2014, p. 63). Further, as Stets and Cast (2007) discussed, these contextual factors can be subdivided into three distinct categories – personal, interpersonal, and structural – through which identity verification can facilitate referential accumulation, relative to the identity being supported, over time.

Role identity development, then, is roughly conceptualized as a reaction to personal, circumstantial, and/or environmental disequilibria – inherent in contexts failing to support the role identity – generally occurring as a consequence of one or more attendant stressors. Perhaps because of the overall rarity of this confluence of conditions happening in mundane, daily life, role identities are

most often characterized by their stability and resistance to change (Serpe, 1987). Rarely, though, role identities do undergo highly accelerated periods of development: As Burke and Stets (2009) have detailed, there are both exogenous and endogenous sources of role identity change that an individual can experience, ranging from extreme and abrupt social changes – like winning the lottery or losing a high-paying job – to personal epiphanies and identity crises brought about by undertaking illegal or morally reprehensible actions.

Generally, in their discussion of identity changes Burke and Stets (2009) tended toward the conclusion that rapid shifts in role identity would come about through exposure to a significant event, though the transformative characteristics of that event might well be determined on a case-by-case basis. Clearly, though, internal identity development in response to a changing social environment could be brought about through significant enough exogenous pressure. (See Burke & Stets, 2009 pp. 180-182 for a full discussion).

Concerning the topic of adolescent Geek identity transitions, this would position the developmental trajectories found in ethnographic accounts of the phenomenon as being a source of – and, over a short period of time, a reaction to – accelerated role identity development brought about by the stresses resultant from negotiating the novel social demands of adolescence and the consequences of peer imputation of a stigmatized Geek identity. This would likely be exacerbated in the adolescent peer context through a number of means, both directly, through enforced crowd assignment (as in Bishop et al., 2003), and indirectly, through the advent of name-calling and negative labeling in schools (as in Francis, Read, & Skelton, 2012 and Rentzsch, Schutz, & Schroeder-Abe, 2011). However, as identity theorists do not tend to linger overmuch on the grand causal import of social environments, but rather on the personal relevance of such circumstances, it was advisable to look outside of IT for a means of capturing the significance of adolescent peer crowd changes to the process of adolescent Geek identity transitions.

This necessary shift in theoretical perspective had the pleasantly surprising effect of highlighting the complementarity of IT and SIT, especially with regard to their application in the empirical investigation of adolescent social development. But, at least to begin with, it is first useful to elucidate the differences between IT and SIT, such that SIT is more definitely described in its own terms: Unlike IT, which internalizes social and group interactions as social *roles*, SIT research is instead concerned with the dynamics of *category* or *group* identity processes referencing social group membership in a particular context (Stets & Burke, 2000).

As Hogg (2016) has clarified, one of the key research strands in SIT is self-categorization theory, which postulates a social understanding of group membership based on a prototypical understanding of the group's characteristics and values, such that a group's *entitatitivity* – that is to say, it's definition or distinction relative to other archetypal groups – is maximized (2016, p. 8). By way of example, the Geek group might be understood by other social orders according to their most iconic stereotypical traits, such as thick glasses, pocket protectors, and poor fashion. And, indeed, especially when working with children and adolescents, there are more than a few anecdotal findings to demonstrate that it is not at all uncommon to see influences of just this type (see Anderegg, 2007 for discussion).

Efforts on behalf of group members to maximize entitatitivity are thought to give rise to two interrelated effects: First, in-group commonalities are valorized, and, second, out-group differences are accentuated (Hogg, 2016, p. 9). This may be seen as damaging for marginal members of the group – those who fail to match the prototype in a clear and consistent manner – and for the identity of the group to which those marginal members belong, as it can give rise to intragroup struggles, arguments, and schisms (Hogg, 2016, p. 12). Here, the twin influences of intergroup and intragroup marginalization bear some noteworthy relevance for young people undergoing adolescent Geek identity transitions at multiple levels, both from the position of being students in the prototypical group in the context of

schools, and internally, from the position of being forcefully categorized as a Geek – a marginal group – while, at the same time, holding beliefs or values that may make one feel they do not belong.

In a manner that is remarkably similar to its formulation in IT, identity transitions are thought to be relatively rare processes, as in SIT, too, identities are considered to be "particularly resistant to change" (Ethier & Deaux, 1994, p. 243). Furthermore, when articulating the mechanism for identity transitions in SIT, the construct of identity salience is again emphasized, with group identity matching a changed social context being a condition for increasing the salience of the group identity (Ethier & Deaux, p. 244), and feelings of low self-esteem as a result of being identified with a social group being conceived as a precondition for group identity transition (Ethier & Deaux, p. 249).

This effect has been found to occur consistently with regard to group identity transitions. For example, in their longitudinal study of the influence of young adult life-style transitions – specifically passing from high school to university – on group identification and well-being, Iyer, Jetten, Tsivrikos, Postmes, and Haslam (2009) found that compatibility of context and identity were a meaningful influence on the well-being of new college students. In their words:

> The more the university identity and the old identity were perceived as incompatible and the fewer group memberships the student held before the transition, the lower well-being was a few months after entering university. […] Those who perceived identities as incompatible before the transition and those who initially had fewer group memberships were more likely to resist identification with the new group. (Iyer et al., 2009, pp. 718-719).

Returning for a moment to adolescent Geek identity transitions, these insights about identity transition from the vantage of SIT prove useful for two reasons: First, they generally provide the framework of an argument for the intrinsic significance of group transitions as exogenous facilitators of situational role identity change; second, they offer a nuanced proposition for the potential underlying

process by which a multiplicity of developmental trajectories might be conceptualized. That is to say, following Ethier and Deaux (1994) and Iyer et al. (2009), it may be hypothesized that it is, in part, the influence of an adolescent *crowd identity transition* – a known form of adolescent social group identity transition (McFarland & Pals, 2005) – which may be observed in the divergent developmental trajectories of adolescent Geek identity transitions.

As such, from this perspective, it is possible to infer that variant findings like those of Kinney (1993) could be, from the position of SIT, demonstrating the effect of compatibility/incompatibility between the transition identities of middle school Geek and high school Geek students. Likewise, it might be that findings of embraced Geek identities, as discussed in Bucholtz (1999; 2011), may be the product of closely aligned social context and salient Geek group identification.

This line of reasoning bears some similarity to that which was previously employed by McFarland and Pals in their (2005) study of adolescent identity changes in the high school social contexts. Harnessing both the theoretical perspectives of SIT and IT – much like as is the case with this current dissertation study – McFarland and Pals (2005) hoped to explore the effect of social categories, those macro-level groups alluded to in SIT, and network effects, consistent with the smaller contexts necessitated in the theory of role identities as expressed in IT. Focusing the bulk of their work on isolating the mechanisms identity development as a result of contextual factors in both students' peer categories and friendship networks, McFarland and Pals (2005) advanced a number of unexpected theoretical positions bridging IT and SIT based on their findings. Foremost among these was their assertion that identity transitions could be promoted by changes in peer network relationships, but that such changes tended to be unidirectional; or, as they put it

> In most instances, social relations change and various perceptions of identity imbalance follow; this process in turn motivates youths to change their identity over time. The reverse does not

hold, however: characteristics of categories and identity motives do not lead adolescents to change their networks over time (McFarland & Pals, 2005, p. 290).

Further, they argued that, with respect to changes in peer social networks and identity, "network change and identity change are due to different mechanisms" (McFarland & Pals, 2005, p. 306), with changes in the former being influenced by elements such as social prominence and peer network bridging, and the latter being attributable peer group homogeneity and perceptions of identity inconsistency (2005, p. 306).

Although the present study did not directly attend to the more intimate topic of peer networks in the process of adolescent Geek identity transitions, the value of McFarland and Pals (2005) study was that it offered broad empirical support for the theoretical notion that an exogenous situational identity change could, in the manner of a rapidly shifting peer network change (perhaps, both literally and figuratively, based on the circumstances), produce the conditions for both a crowd identity transition and role identity development. It is worth noting, too, that the process by which student identity was operationalized in McFarland & Pals (2005) mirrored this conceptualization by attaching concrete terminology to the more elusive, abstract ideological character of social categories as they exist in SIT, which, though often unstated, would be a necessary precondition for the adaptation of a group identity as a personal identity in any study that would make extensive use of the construct.

And so, by combining both the perspectives of IT and SIT, it was the theoretical approach of this dissertation study to model adolescent Geek identity transitions in terms of their role identity development – wherein the young persons are thought to have undergone an internal reorganization of their self-concept relative to the idea of being and performing the Geek identity during adolescence – and, at the same time, to model these identity changes as crowd identity transitions demonstrating

increasing or decreasing levels of salience of the Geek group identity as a result of the imputation of a Geek identity.

Theories of Creative Identity Development

Having sought multiple perspectives by which to operationalize the internal character of adolescent Geek identity transitions, attention was then turned to the task of extending the theoretical model of this dissertation study to encompass the relationship among social context, identity, and creative behavior. Here, I relied on the body of literature in the area of creativity research which detailed the study of creative identity development, and most particularly those models which could be adjusted to reflect adolescent developmental contexts.

As with the research constituting the area of Geek studies, it would be imprudent to suggest that the strands of academic literature relevant to creative identity development are, themselves, fully mature. At present, not many more than a dozen empirical investigations of this type have been carried out, and, as a theory, it appears to be the case that the study of creative identity has, until recently, been largely subordinated to the larger, more influential theory of creative personality.

It is possible to trace this shared history of the two theories to the early collective efforts of researchers from the renowned Institute of Personality and Research (IPAR). In pieces like MacKinnon (1963), Barron & Harrington (1981), and Helson (1996), one can find references to key elements that relate the notion of the creative self to ideas of identity as a construct. MacKinnon (1963), for example, focused with considerable intensity on creative "images of the self" by which he theorized a coordinated pattern of the creative individual's "perceptions, conceptions, and images of himself as a person" (1963, p. 253). Helson (1996), too, described the stability creative personality as being attributable to an individual's "role, goals, working conditions, and social identity" (1996, p. 297).

But, although they touched on the topic of identity, by and large, IPAR researchers did not appear to consider it a goal to create a fully formed identity theory, nor did they connect to theories of identity as they had been adhered to in other fields of psychological investigation. Rather, they proceeded along a divergent course of research emphasizing the creative personality that attended to the role of individual creative traits and tendencies and the coordination of those traits as being contributory to creativity (Runco, 2007). As a result, this decision disconnected the majority of IPAR research from systematic, deductive descriptions of relationship between an individual's self-concept and creativity, instead exploring individual differences in creativity inductively through such means as self-reports (as in MacKinnon, 1963; MacKinnon, 1966) and interviews (Helson, 1999).

Whereas IPAR studies would have first addressed creative identity, at least by implication, in articles going back nearly 70 years, it would not be until much later that creative identity theories would be formulated in their own right. Among the vanguard of the second wave of researchers who would champion a theory of creative identity was Robert Albert, who, as early as the late 1980s, proposed a theory of creative behavior that not only stressed the importance of the creative individual but also the co-development of a personal and creative identity which could drive one another such that a lifetime of creative development could be achieved (Albert, 1992).

Albert's (1992) theory of creative behavior development was ambitious and expansive, being composed of six interwoven characteristics: That (a) creative behavior is primarily the result of decision-making on the part of the individual, (b) such decisions are intentional, (c) that identity and creativeness are co-emergent, (d) that identity and creativity are synergistic, (e) identity and creativity share maturational bases, and (f) that contextual fit (here emphasizing career choices) enhances both an individual's creativity and their successes. Thus, according to Albert (1992), identity-referent creative behavior is the product of tensions between an individual's intentions and their interactions in interpersonal context; the consequences of this interplay inform creativity over time.

Embedded within Albert's (1992) theory were important ideas drawn from Marcia's (1966) *identity status theory (IST)*, including the prominence of adolescence as a critical period in identity development and concepts of identity foreclosure and diffusion, though these were discussed mainly from the perspective of the risks to the development of eminence for young gifted individuals. This theme of connecting creativity research, especially in reference to adolescents and young adults, to the identity status paradigm has since been expanded in a number of empirical investigations, though, to date, they have typically done so using relatively simplistic methodologies.

Studies like that of Barbot (2008), for example, have investigated the role of conceptual identity groupings – identity statuses – which were historically represented in IST relative to their influence on creativity. His work, for its many strengths, tended to elide the complexities behind the formulation of those identity status (see Luyckx, Goossens, Soenens, & Beyers, 2006 for a discussion), instead studying only the four statuses represented in the most basic model. Likewise, Dollinger, Dollinger, & Centeno (2005) utilized Berzonsky's (1989, 1994) IST-derived notion of *identity styles* to capture the influence of identity on creative potential and creative behavior, which was, in some ways, an even simpler approach, as it relied on just three very broad classes of social-cognitive orientation.

Perhaps, overall, the impetus for this simplification of IST in the creative identity development literature is the conceptual complexity of the identity status paradigm itself, which contains its own diverse ecosystem of research perspectives, formulations, and controversies (for a very brief sampling, see van Hoof, 1999; Waterman, 1999; Schwartz, 2001).

Roughly contemporaneous with creativity research that was being carried out utilizing models embedded in an IST framework, a separate but related strand of research was developed with the intention of postulating theories of creative behavior based in the exploration of identities as they were

understood in the symbolic interactionist paradigm. Chronologically, these articles began to appear about a decade after work on identity statuses, with a foundational piece being Petkus (1996).

Central to that work was Petkus's adaptation of McCall & Simmon's (1978) role-identity theory into a cohesive model of creative identity development. Here, the author advanced a triune model by which role-identity, role performance, and role support continually augmented creative behavior in a manner not unlike a positive feedback loop (Petkus, 1996, p. 191). Meaningfully, the model was predicated on a novel construction of the role-identity, which had been heretofore typically concerned with more mundane role representations (cf., Burke & Tully, 1977; Callero, 1985), as a creative role identity which the author depicted as a symbolic association with various other roles, creating identities described as a "creative teacher" or a "creative employee." (Petkus, 1996, p. 192).

As with other studies derived from the identity theoretic framework (some of which were discussed in an earlier section), here *supports* were simply "verifications by others of an individual's role-identity – i.e., reactions of others to appearances and behaviors associated with a role-identity" (Petkus, 1996, p. 193). And so, a straightforward interpretation of the model would yield the direct relationship that creatively supportive contexts would strengthen creative identities, and would thereby increase creative behaviors. This would, in the long run, create a circumstance wherein creative behaviors could find expression in more creatively supportive environments, starting the cycle over again. It is vital to note here that throughout this process, what anchors this more generalized role identity development model to creativity is Petkus's (1996) unique formulation of the creative role identity, without which the model might be thought to non-specifically describe any sort of role identity change over time.

The idea of a creative role identity was later expanded in a model put forth by Farmer, Tierney, and Kung-McIntyre (2003) which elaborated the antecedents of creative role identity in a Chinese

organizational environment – in this case a workplace – as attributable to perceived co-worker creativity expectations, self-views of creative behavior, and exposure to U.S. culture. With regard to employees' creative performance, the authors found that a stronger creative role identity – as defined by greater scores on measures of the nominated antecedent factors – predicted increased creativity (Tierney, 2015).

In a sense, Farmer, Tierney, and Kung-McIntyre's (2003) study and those descended from its relational model, such as the works of Tierney and Farmer (2011) and Wang and Cheng (2010), might best be perceived from the perspective of symbolic interactionist researchers as being the clearest examples of an application of identity theory (IT) to creativity, as they fundamentally attended to the way in which a creative individual might enact identity-relevant behavior in a social context (Stets & Burke, 2000). More so, given the highly structured, hierarchical nature of the workplace environment, it may be further argued that this line of inquiry may be classified as theories of regulated creative role identity, whereby an organizational role was deliberately drawn into the awareness of an individual (Alvesson & Willmott, 2002).

Similarly, this dilemma of an individual potentially responding to a context by means of a multiplicity of personal interpretations has seen parallels in the writings of creativity researchers who base their work in social identity theory (SIT). Positing that the salience of a social identity could be manipulated in such a way as to influence creative performance, Adarves-Yorno, Postmes, and Haslam (2006) presented one of the first models by which group identities might interface with perceptions of creativity. They proposed, and their findings supported, that group identification shaped perceptions of the creativity of ideas based on the content of the group identity and the salience of the group relative to participants' personal identities (Adarves-Yorno, Postmes, & Haslam, 2006, p. 16). Afterword, this same logic was extended to investigations of creative activities, the study of which found that the

normative boundaries of groups tended to be respected in acts of creative production (Adarves-Yorno, Postmes, & Haslam, 2007).

The underlying theme of creative identity research in the related social identity framework followed the proposition that adherence to certain group identities whose values relative to creativity in general or a creative activity – in other words, the salient, creative *identity content* (Turner, 1999) – could have an influence on members' creative expressions. In studies like that of Tang and Naumann (2016), for example, a number of possibly conflicting social identities, including team identity, family identity, and expert identity, were compared to determine which, if any, had the greatest impact on employees' creativity. They found that team identity most strongly affected incremental creativity and that expert identity most strongly associated with radical or "breakthrough" creativity, with a crossover effect occurring for both identities (Tang & Naumann, 2016, pp. 126-128).

And so, given these many strands of creative identity research, which among them might be of greatest utility to the present study? In truth, there was some use to be found for all of them. Much like the stance which was adopted earlier regarding theories of adolescent identity transitions, it was my position that, rather than follow any one theory of creative identity development, it was better to integrate elements of various theoretical frameworks into the composite model of this dissertation study so as to better elucidate from a variety of perspectives the influence of adolescent Geek identity transitions on the creative behaviors of young people.

Working from one of the most basic of creative identity models, that of Petkus (1996), the circumstantial and personal interactions which provide the basis for engagement in creative behavior are defined as unidirectional linear effects: In other words, it was from this foundation that an elementary progression from predictors to creative identities, and finally to creative behaviors could be conceptualized. The model could then be elaborated such that other vantages in creative identity

development were represented, the overall discussion of which will be unpacked and detailed in the upcoming chapter.

Some specific instances to consider, though – ones which were owed directly to the diversity of perspectives in the literature – were in the determination to expand the concept of a personal identity beyond the basic notion of the role-identity to adequately reflect the importance of crowd identity in adolescent Geek identity transitions (see *Theoretical Framework* for discussion), as well as the decision to broaden the selection of predictor variables to provide some attention to natural group characteristics of the type recognized in social identity theory (see *Instrumentation* for more), and, finally, with concern to carrying out a statistical analysis of the model, whereby a deep consideration of the theoretical arguments of adolescent creative identity development from the viewpoint of identity status theory helped to uncover useful procedures by which to analyze adolescent Geek identity transitions. (See *Data Analysis* for more).

CHAPTER III

METHODOLOGY

The purpose of this survey study was to investigate adolescent Geeks' identity transitions, predictive influences on the identity transition, and their potential to influence the creativity of young people.

Three questions guided the study:

1. What is the nature of adolescent Geek identity transitions?
2. What are the personal and support predictors of adolescent Geek identity transitions?
3. To what extent do adolescent Geek identity transitions influence expressions of creative behavior?

This chapter is organized into seven sections describing the theoretical framework, instrumentation, participant population, data collection, data preparation, data analysis, and limitations of the study.

Theoretical Framework

At its heart, the theoretical framework employed in this dissertation study was based on a simple observation: That developmental changes in adolescent identities can form the basis for engagement in creative behaviors. Or, more concisely, that – in agreement with creative identity researchers such as Petkus (1996) and Adarves-Yorno, Postmes, & Haslam (2006, 2007) – a study of creative behavior could be predicated on a relationship between identity and creativity whereby, in the broadest sense, significant identity interaction within a salient social context can promote behaviors of the creative sort. This, in turn, was something of a generalization of Mead's (1934) original insight that

"society shapes self shapes social behavior," such that, in the language of modern identity theory, it may be thought that "commitment shapes identity salience shapes role choice behavior" (Stryker & Burke, 2000, p. 6) where role choice behavior, was, in this instance, creative behavior.

Articulating the import of identity in this study, however, was not limited to a single theoretical lens. Rather, this study depended on a composite model of creative identity development which drew on the complementary strengths of both identity theory (IT) and social identity theory (SIT) as a unified medium through which identity development could be modeled relative to contextual and personal factors and an influence on the expression of creative behavior. This was necessary for the reason that no prior research had attempted to summarize the ethnographic findings in studies of adolescent Geeks as a single identifiable series of events in the identity development. And so, deducing a model for these overall relationships required nominating novel constructs related to Geek identity and Geek identity development and situating them in extant theories of creative identity development.

This process relied on operationalizing the observed multifinality of developmental trajectories in adolescent Geek identity development as consequent conditions of exogenous *situational identity development* (as in Burke & Stets, 2009) precipitated by a myriad of identity-referencing situations, such as the attribution of a Geek crowd identity by peers or negative labeling by other students, occurring at an early point in adolescence. Together, these identity-referencing situations were conceptualized from the theoretical vantage of SIT as relating to prototypical characteristics of the Geek group identity, found most directly in adolescent associations with the Geek crowd in the adolescent context.

Giving equal weight to, and affording the possibility of equal and joint potentiation of, identity development to both internal role identity processes as promoted in IT and external crowd identity processes as proposed by SIT, the present study advanced the notion that adolescent Geek identity transitions were products of both *Geek role identity development* and *Geek crowd identity transitions*.

For reasons elucidated earlier (see *Identity Transitions of Adolescent Geeks* in the prior chapter for more), these were defined relative to their salience in the histories of adolescent Geeks by the extent to which they were represented in the young person's current identification and prior identification at a point previous to the start of middle school. Again, concerning the latter, this was because it was found to be the case that it was during early adolescence – and especially the first few years of middle school – wherein the conditions of a situational identity change were most clearly recognized referencing adolescent Geek identities in particular (cf., Bishop et al., 2003; Rentszch, Schutz, Shroeder-Abe, 2011; Stanton, 2011). For ease of reference, these construct definitions are provided in a summary form in Table 1 (below).

Table 1

Adolescent Geek identity transition construct definitions

Construct Name	Definition
Geek Crowd Identity Transition	Self-perceived differences in the extent to which adolescents were imputed by their peers with the Geek crowd identity by means of association with archetypal Geek traits.
Geek Role Identity Development	Self-perceived shifts in the alignment of adolescents' personal beliefs about oneself in consonance with or opposition to characteristics which comprise the symbolic content of the Geek role identity.

Together, these two identity development constructs served as the central variables around which the present study was organized, and the research goals of the study were to determine the conditions which predicted variation in the constructs and how, consequently, these elements of identity transition may have influenced the creative behavior of adolescents. To describe the overall structure of this larger series of influences, the composite model was expanded utilizing the theoretical perspectives of adolescent creative identity development and by elaborating on a basic model of interactions proposed by Petkus (1996) whereby a triune synergy among social support, role-identity, and creativity were thought to facilitate creative behavior.

In addition to the most obvious alterations of Petkus's (1996) model – those which fleshed out role-identity development according to a more complex set of internal and external identity interactions – a number of modifications were made to support the later process of analysis and to better capture elements in the adolescent Geek social environment.

It was, in delineating a starting place for these alterations, deemed wise to more fully specify the loosely conceptualized idea of creativity such that a number of specific effects on creative behavior could be determined. Focusing on the task of assessing both domain-general and domain-specific creative behavior (see Baer, 1998 and Plucker, 1998 for vivid discussion), I adopted the approach of Paek and Runco (2017) which promoted the position that creative behaviors could be conceptualized as having components that were both domain-general and domain-specific and, additionally, that performance within and across domains could be described as relating to both the quantity and quality of creative endeavors. (See *Adapting an Outcome Measure* for more).

Similarly, a second set of predictors encompassing personal characteristics thought to more proximally predict the developmental trajectories of an adolescent Geek identity transition – most specifically those reflecting ongoing challenges in the evolution of Geek culture – was appended to the model. These included those areas around which the greatest discourse had heretofore been generated regarding cultural aspects of Geek communities, such as issues of gender, cultural background, and SES, as well as those which would apply to the adolescent Geek context, including both current age and age at joining middle school.

The notion of the predictive power of social support, too, was augmented from its original state in Petkus's (1996) model, both elaborating the support contexts most influential for young academic achievement-oriented adolescents – most especially, those of peers, family, and educators (Hébert, 2011) – and also intensifying the concept by means of extending it into the explicit domain of *intrinsic*

support, as this was found to be among the most effective types of support to offer adolescents (Young, Miller, Norton, & Hill, 1995).

In sum, these modifications resulted in the composite theoretical model of predictive factors, adolescent Geek identity transition constructs, and creative outcomes displayed in Figure 2 (below).

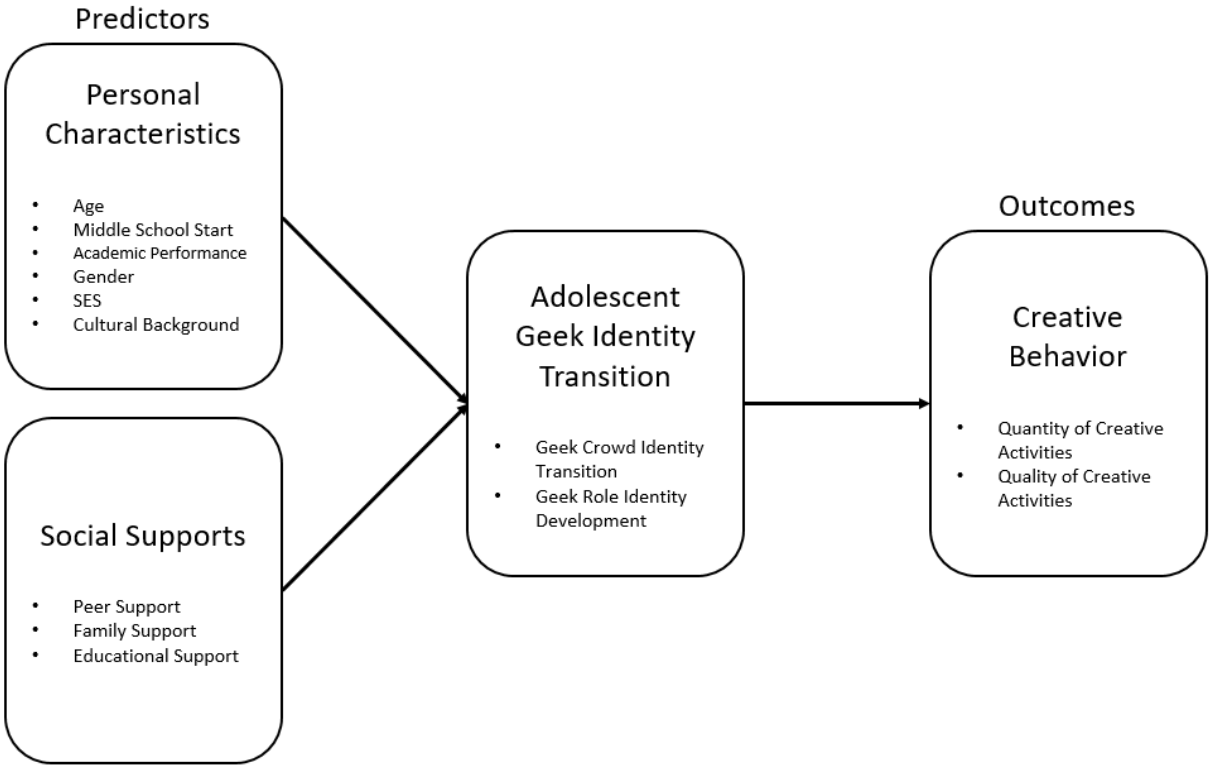

Figure 2

Theoretical model of the study

Instrumentation

In order to collect data relevant to the central constructs of the study and selected predictor variables, a researcher-designed survey instrument (Appendix A) was created and paired with an extant measure of creative behavior, the Creative Activities and Accomplishments Checklist (CAAC: Paek & Runco, 2017). The researcher-created instrument was generated with the purpose of measuring three areas: (a) adolescent Geek identity transitions, and both (b) personal characteristics and (c) social supports predictive of this type of situational identity change.

This instrument was instantiated as a web-based self-completed survey to be administered to adolescent participants. The development of the instrument involved an eight-stage process which spanned from concept clarification to a pilot study. This is presented in a tabular form (Table 2, below).

Table 2

Survey instrument development process

Developing a measure of Geek identity transition
Concept clarification
Item identification
Response scale construction
Selecting predictor variables and an outcome measure
Identifying predictor variables
Identifying additional descriptor variables
Adapting an outcome measure
Finalizing the survey instrument
Feasibility study
Pilot study

Following sections will address each step of the process and provide a detailed account of that stage of instrument development.

Developing a measure of adolescent Geek identity transition

Concept clarification

A primary consideration in the development of a survey instrument for the present study was to ascertain a means by which to specify the constructs of adolescent Geek identity transition in such a way that they could be apprehended in a quantitative analysis. In one sense, given the nature of the constructs, this was not an overtly onerous task: As they were intended to represent pathways of development, parameterization of the constructs of adolescent Geek identity development along a continuum of change over time in the representation of the Geek identity to the participant would be a sensible approach.

However, this type of specification immediately spoke to a deeper empirical question of how the variant developmental trajectories of adolescent Geek identity transitions would be composed during the process of data analysis. Here, after some careful contemplation, it was determined that, in order to support the primacy of the observation that adolescent Geek identity transitions were distinct developmental trajectories, *the emphasis would not be on the incremental contribution to the model of the difference between indicators of either construct*, but would rather serve to generate a holistic representation of the paths chosen by adolescent Geeks.

This would underscore the postulate that adolescent Geek identity transitions were not, themselves, an experience of identity change along a single internal or external dimension, but were considered simultaneous overall progress along a developmental pathway reflected by the adolescent's self-reported Geek role and crowd identities at the time they engaged with the survey instrument. Even though this conceptualization of identity transition may seem odd from the traditional perspective of IT or SIT, it bore some strong resemblance to the method of capturing identity change employed by McFarland and Pals in their (2005) study of the influence of adolescent crowds on personal identity.

That being said, according to the method proposed by McFarland & Pals (2005), specifying any indicators of adolescent Geek identity transition would entail first parameterizing crowd identity change employing the logic that identity imbalances resultant from adolescent crowd membership functioned such that social identity change was a result of a "mismatch in crowd affiliations over time (Actual crowd $t_1 \neq$ Actual crowd t_2). Thus, if a respondent said that his or her actual identity was "Popular" at time 1 and "Druggie" at time 2, it was recorded as a change in social identity" (2005, p. 295).

In this way, respecifying the operationalized constructs of adolescent Geek identity transition as measures of situational identity change could be accomplished by rendering the social effect of exogenous identity change equivalent to assessment of perceived crowd affiliation at two points in adolescence, such that social identity change as a result of moving away from the stigmatized Geek crowd to another, higher-status crowd could be conceptualized as (Geek crowd $t_1 \neq$ Geek crowd t_2), where t_1 and t_2 were a previous and subsequent self-description of crowd affiliation, respectively. Similarly, identity change as a result of remaining in the Geek crowd despite its stigmatized status would be equivalent to the condition (Geek crowd t_1 = Geek crowd t_2) with the delineations presented above.

Notably, when this method was propositionally scaled with degrees of affiliation with the Geek crowd in t_1 and t_2, it appeared to reproduce the conditions of the known developmental trajectories demonstrated in works like Kinney (1993) and Bishop et al. (2003), wherein adolescent Geeks were shown to have started with a strongly imputed affiliation to the crowd which diminished over time, as well as in Currie, Kelly, & Pomerantz (2006) and Bucholtz (1999: 2011), in which the Geeks studied were imputed with the identity at an earlier time, but generally did not relinquish it.

In this way, two indicators were formulated for use in the present study: Previous and current Geek crowd identification, both of which together were thought to be contributors to a *Geek crowd identity transition*. Definitions for these indicators have been provided in Table 3, below.

Table 3

Indicators of Geek crowd identity transition

Indicator	Definition
Previous Geek Crowd Identification	Having been identified by one's peers prior to early adolescence as having characteristics associated with the Geek crowd.
Current Geek Crowd Identification	Having been identified in adolescence as having characteristics associated with the Geek crowd.

Where this approach to identity through the medium of association with social characteristics was weakest, however, was in particularizing the extent to which these changes in social identity might have altered the personal identity orientation of adolescent Geeks. Could it truly be said, for example, on the basis of self-reported previous and current crowd identity affiliation alone that an adolescent who had been imputed with the Geek label at a previous point and had indicated continued affiliation with the Geek crowd at a later point actually thought themselves to be Geeks? Might they still be in the midst of the process of normalizing or otherwise feel themselves unwilling participants in a crowd they would choose to leave, but cannot?

These arguments provided yet another reason to credit the idea that it was necessary to include a second measurable construct alongside the social identity-centric construct: In particular, a contextual measure of personal identity like that which is encompassed in the concept of *Geek role identity development*. However, from the outset, the prospect of usefully employing role identity development required a return to the fundamentals of the situational identity change condition, most especially through examination of the *identity standard* characteristics embedded in the change, as well as a re-evaluation of major elements in the 'geek vs. popular' dichotomy as given in works like that of Bishop et al., (2003) and Bucholtz (1999).

This was because, as Burke & Tully (1977) have described them, role identities "do not stand in isolation but presuppose and relate to counter-roles, and, in fact, can only be understood in relationship

to counter-roles" (p. 883). In practice, then, the identity standard of a role identity was a set of meanings, or characteristics of the identity, that were populated by symbolic associations with how an individual understood the identity, which, further, could be teased apart from other identities on the basis of comparison to a diametric alternative (Stets & Serpe, 2013).

In the case of the adolescent Geek role identity, the counter-role was – at least for purposes of this present study – defined in terms of its opposition to the more highly desirable "popular" (Bishop et al., 2003, p. 148) identity. Utilizing this dichotomy as a comparator, the conditions of role identification and comparison enumerated in Burke & Tully (1977) were soundly met, as the meanings inherent in belonging to each of these crowds had often been demonstrated to be antithetical to one another. Anderegg (2007), for instance, described this innate Geek/Popular opposition as a cultural phenomenon conveyed in terms of the perceived mutual exclusivity of being "sexy" and "dumb" or being an "ugly" but "intelligent" nerd.

Likewise, Bishop et al. argued from this position in their (2004) work, demonstrating with empirical data that parents of students in their study preferred "by a margin of 2-to-1 " that "if forced to choose, they would prefer their sons or daughters to make C grades and be active in extracurricular activities rather than make A grades and not be active," after which they wryly noted that "'makes A grades and not be active' [is] a code for nerd or dork, while athletics is the ticket to social status." (2004, p. 235).

Most soulfully, the intense polarity between the meanings that comprise the character of the Geek and Popular crowds were the basis of Graham's (2003) autobiographical writings, wherein he problematized the question of "why nerds are unpopular." In a personal essay, Graham chronicled his own experiences being an adolescent Geek, noting the conundrum that, if he had chosen, he believed

he might have been able to be a popular student (2003, pp. 1-2). However, instead, he chose to be a nerd because, as he put it:

> There was something else I wanted more: to be smart. Not simply to do well in school, though that counted for something, but to design beautiful rockets, or to write well, or to understand how to program computers. In general, to make great things (Graham, 2003, p. 2).

And so, the measurement of the role identity development complemented the crowd identity construct in the conceptualization of adolescent Geek identity transitions by providing a means for determining the extent to which the experience of identity change brought about a shift in the alignment of personal beliefs, at both a prior time and in the present (as earlier, with Geek peer crowd identity change), about the self *for* or *against* the meanings associated with the Geek identity. These indicators of Geek role identity development are presented for ease of perusal in Table 4, below.

Table 4

Indicators of Geek role identity development

Indicator	Definition
Previous Geek Role Identity	Alignment of personal beliefs about oneself in consonance with or opposition to characteristics which comprise the content of the Geek identity prior to early adolescence.
Current Geek Role Identity	Alignment of personal beliefs about oneself in consonance with or opposition to characteristics which comprise the content of the Geek identity at the present time.

Defining these indicators of Geek crowd identity transition and Geek role identity development was an important first step in generating the items that would make up the researcher-created survey instrument. Throughout this process they were, by design, formulated in such a way as to not only adequately specify adolescent development in terms of personal and group conceptualizations of identity, but also facilitate an analysis of the developmental pathways of adolescent Geek identity

transition which would be advanced at a later stage of this work. (See *Data Analysis* for further discussion).

Item identification

The process of identifying items based on the indicators of adolescent Geek identity transitions was, in the most basic sense, one of finding common ground between characterizations of the Geek identity as it would be applicable to both the role identity and crowd identity conceptualization. This suggested a method that differed from that of previous researchers – which usually depended on utilizing some form of the Geek label (see McCain, Gentile, & Campbell, 2015 for an example) – instead relying on items based on the characteristics of the Geek identity as it might be understood by adolescents in the zeitgeist of this era.

As a starting point in this process, I reviewed a set of ten recent academic works which had touched on the related topics of the identities of young adult and adolescent Geeks. These included books, articles, and chapters which contained interviews with adolescents in the Geek crowd, as well as reflections about adolescent Geeks from the perspective of non-Geek students, teachers, and parents. Working from that body of literature, I extracted key adjectives and descriptive phrases by which Geeks were characterized in each work (presented in *Appendix A)*. In total, a list of 47 Geek traits were identified across several studies and both a bulk list of the traits and a smaller, convergent list of seven characteristics mentioned more than four times across studies were compiled.

These lists of Geek characteristics were then presented to a group of six Geek culture experts – so-called “alpha nerds” (Woo, 2012) – representing a wide swath of backgrounds and interests related to the Geek culture, ranging from experience with pen-and-paper roleplaying gaming and live-action roleplaying to developing collectible card games and creating fantasy art. These experts were asked to

examine the larger list of 47 descriptive traits with the purpose of (a) removing items that may be too closely related, (b) removing items that did not reflect their understanding of the Geek culture, (c) providing a list of items they felt were the best indicators of the Geek crowd identity as understood by adolescents, and (d) suggesting any items they felt may be missing from the list. The experts were then asked to review and discuss the smaller list of Geek characteristics, as well as a researcher-generated list of opposing traits, for use as a standard of the Geek role identity and, for the converse list, as its comparator.

The list of descriptive items was then modified based on the feedback of experts, whereby items that had been supported by four of the six reviewers (a 2/3^{rds} majority) were retained and extraneous or redundant items were eliminated. Because there was some disagreement about items to be added to the list, no new descriptors were presented to experts for consideration. Furthermore, as the process unfolded, I found that, generally, an elimination of extraneous items and redundancies was essentially tantamount to a selection of the best traits in nearly every case, and so, even though both types of selection standard were recorded and considered, they amounted to similar outcomes in the review. When all was said and done, this process resulted in a truncated list of 14 descriptive items used to assess both prior and current Geek crowd identification constructs (see Table 5, below).

Table 5

Refined list of 14 Geek characteristics

Academically focused	Not aggressive
Ambitious	Obscure interests
Different	Passionate expert
High-achieving	Shy
Intelligent	Unpopular
Interested in technology	Valuing individuality
Nonconformist	Valuing intelligence

A slightly different approach was employed in the refinement of the descriptors for use in the measure of Geek role identity. In this instance, an expansive, if informal, conversation was facilitated wherein the purpose of the items and their contraindicators were reflected upon by alpha Geek experts. In the majority of discussions, experts agreed that the list was mostly aligned with a version of the Geek identity as it might be understood in the context of adolescents. One pair of original items, “intelligent” and “unintelligent”, was deemed by experts to be too controversial in the negative case, and so was removed. Moreover, an item from the larger pool of characteristics was unanimously suggested by experts to be added to the Geek role identity: “Obscure interests.” As a contrapositional term, experts liked “normal interests” with which the descriptor was then paired. As such, a final list of seven paired items, sans one initial pair and with the addition of a suggested pair, was produced (as seen in Table 6, below).

Table 6

Characteristics of the Geek role identity and its comparator, the Popular role identity

Geek role identity	Popular role identity
Academically focused	Not academically focused
Studious	Not studious
Not socially skilled	Socially skilled
Unfashionable	Fashionable
Unpopular	Popular
Not athletic	Athletic
Obscure interests	Normal interests

Response scale construction

Having undergone refinement, the Geek characteristics for both crowd identification constructs and the pairs of characteristics for the indicators of the Geek role identity change were then affixed to an item grammar connecting the traits to the parameters of the assessment. For items associated with

the Geek crowd identity transition, this would mean situating the characteristics as referents of peer crowd indication at two distinct points in time.

Concerning the first point in time – the moment at which the participant was engaging with the survey instrument – an effort was made to connect crowd identity and adolescents' current concept about themselves to bridge the gap between crowd identity and role identity. For the reason that identities are most salient, and therefore likely to be activated, within particular contexts (Stryker, 1980; Stets & Burke, 2014), the grammar that might most clearly indicate a merger of social and role identities could be a present point within their identity development referencing the educational setting for the participant. This generally followed the grammar of "Other students say I am [Geek characteristic]."

For the second referent point, I followed suggestions in the literature that crowd assignation and identification often occurred early in a student's middle school career (Kinney, 1993), and indeed sometimes within a few weeks of first attendance (Bishop et al., 2003), the historical point for the item grammar template was decided to anchor to a proximate event immediately prior to the exogenous changes brought about by the situation. For parity among the crowd identification items, this resulted in a very minor change, with the template appearing as "Other students said I was [Geek characteristic]."

Across both sections of the survey, some items were then modified for ease of reading and to better frame their intent. In a few cases, the intensifier "very" was added to a characteristic, such as "academically focused", for the reason that it better fit the understanding of the boffin (Francis & Archer, 2005) and the streber (Rentzsch, Schroeder-Abe, & Schutz, 2013) being described by their peers as honed to academic topics with notable gravity. Furthermore, some items were adapted to better reflect their role as a characteristic applied to a person, rather than a belief held by a social crowd. These included "valuing intelligence" and "valuing individuality" which were changed to "the type of person who values intelligence" and "the type of person who values individuality," respectively. In all,

the 28 resulting items were compiled into a table and listed by construct to be presented hereafter on Table 7 (below).

Table 7

Survey items measuring crowd identification

Construct	Item Language
Current Crowd Identification	Other students say I am very focused on school work.
	Other students say I am ambitious.
	Other students say I am different.
	Other students say I am a high achiever.
	Other students say I am intelligent.
	Other students say I am very interested in technology.
	Other students say I am a nonconformist.
	Other students say I am not aggressive.
	Other students say I have unusual interests.
	Other students say I get very excited about certain topics.
	Other students say I am shy.
	Other students say I am unpopular.
	Other students say I am the type of person who values my individuality.
	Other students say I am the type of person who values my intelligence.

Previous Crowd Identification	Other students said I was very focused on school work.
	Other students said I was ambitious.
	Other students said I was different.
	Other students said I was a high achiever.
	Other students said I was intelligent.
	Other students said I was very interested in technology.
	Other students said I was a nonconformist.
	Other students said I was not aggressive.
	Other students said I had unusual interests.
	Other students said I got very excited about certain topics.
	Other students said I was shy.
	Other students said I was unpopular.
	Other students said I was the type of person who valued my individuality.
	Other students said I was the type of person who valued my intelligence.

A great deal of care was taken in crafting the instructions for each section, both to facilitate an upbeat survey-taking environment that separated the participant from any possible negative feelings associated with the stigma of the Geek identity, and also to provide a stable reference to the historical points that were being assessed. As such, it was made clear in sections containing the crowd identity items that the adolescent should first regard themselves from the position of their beliefs about their peer's thoughts at the current moment, and then, in the following section, their reflections on those selfsame beliefs as they would have been in their fifth grade year. (See *Appendix A* for more).

It was then, following the creation of the crowd identity items and instructions, that a conversation with the study's methodologist affirmed that crowd identity characteristics would best be measured by utilization of a Likert-type scale, rating 1-to-5, oriented toward the frequency of the peer behavior. In this way, a low score would indicate that the characteristic was (1) never, or (2) rarely, applied to the adolescent by their peers, with a middle point at (3) sometimes the characteristic was attributed, and a high score indicating that the characteristic was (4) very often or (5) always applied.

As with item refinement, the process of scaling the indicators of Geek role identity development differed from that which was applied to items referencing crowd identity. As outlined by Burke and Tully (1977), and later in Stets and Burke (2014), the strongest and most widely accepted method of measuring role identity in the identity theoretic perspective was a comparison in the medium of a *semantic differential scale* (Osgood, Suci, & Tannenbaum, 1957), whereby response to a role identity stimulus was reported as affinity toward one or another of a unipolar pair of opposing traits.

In this form, a participant's response would be recorded along the scaling mechanism central to the pair – in this instance, seven gradations were selected for the sake of clarity, though much like a Likert scale, a variety of divisions may be employed – producing a set of items like those presented in Table 8 (below).

Table 8

Semantic differential scale measuring Geek role identity

I am	**Academically Focused**	_ _ _ _ _ _ _	**Not Academically Focused**
I am	**Studious**	_ _ _ _ _ _ _	**Not Studious**
I am	**Not Socially Skilled**	_ _ _ _ _ _ _	**Socially Skilled**
I am	**Unfashionable**	_ _ _ _ _ _ _	**Fashionable**
I am	**Unpopular**	_ _ _ _ _ _ _	**Popular**
I am	**Not Athletic**	_ _ _ _ _ _ _	**Athletic**
I have	**Obscure Interests**	_ _ _ _ _ _ _	**Normal Interests**

During the scaling process, the overall measure of Geek role identity development was first separated into two sections, one for each indicator. These did not differ in their item grammar, but instead were the same scale with different instructions provided: In the first case, participants were asked to provide a current account of their association with the Geek role identity, and in the second they were asked to provide a retrospective account. As such, the most important inclusion to the role identity indicators at this step was the development of each set of instructions which related the purpose of the semantic differential scale in the section, thus prompting participants to select a response that would represent their feelings about each pair of items by marking a place indicating the direction and strength of their association with either of the opposing terms.

Selecting predictor variables and an outcome measure

Identifying predictor variables

The inceptive impetus for the second stage of survey development was found in the task of identifying predictor variables such that they could be drafted as items for use in the instrument. According to the composite model, these elements were given in two categories: (a) personal characteristics, and (b) social supports. To offer a brief summary, variables selected for inclusion as well as a short rationale for their nomination for use in the survey instrument are presented in Table 9 (below).

Table 9

Enumeration of, and rationale for, included predictor variables

Type	Predictor Variable	Rationale
Personal	Gender	Experiences in the adolescent Geek culture may vary according to gender.
Personal	SES	Geek identity may be represented differently in areas of variant SES.
Personal	Cultural Background	Geek identity may be represented differently with respect to cultural background.
Personal	Academic Performance	Geek identity development interrelates with academic performance and may partially depend on academic success.
Personal	Age	Geek identity development may depend, to some extent, on the age of the participant.
Personal	Middle School Start	Geek identity development may differ based on the duration since the transition began.
Social Support	Family Support	A family's overall orientation toward the Geek identity may affect adolescent identity development in both home and school contexts.
Social Support	Peer Support	Support offered by members of a Geek's "community," be it instantiated physical meetings or via digital media, may affect adolescent identity development.
Social Support	Educational Support	Educators' orientation toward the Geek identity may affect adolescent identity development.

Personal characteristic variables

As mentioned previously, the personal characteristic variables which could predict differences in adolescent Geek identity transitions were gathered from strands of research concerning ongoing, salient topics in the study of Geek culture, both as it applied to the experiences of adults, and, most especially, as it applied to adolescents in educational contexts.

Among these, the influence of *gender* may be the most intense. A number of researchers – among them Schott & Horrell (2000), Varma (2007), Beavis and Charles (2007), and Reagle (2015) – had previously highlighted disparities in the manner in which certain exponents of the Geek culture have tended to treat female members, with the culture being broadly described as a bastion of, as Kendall (2000) put it, "hegemonic masculinity." At the same time, among studies of adolescent Geeks, there were findings to support that the Geek stereotype had acted, and may yet continue to act, as a threat to traditional constructions of femininity, with negative effects on young women's participation in Geeky areas of study, including science (Currie, Kelly & Pomerantz, 2006), math (Chau, 2014), and technology (Archer et al., 2012).

Likewise, it was clear from the literature that a developing influence on adolescents' understanding of the Geek identity was rooted, at least partially, in *socio-economic status (SES)* differences. In their (2012) article, Mendick and Francis problematized the effect of SES by considering the question of whether or not Geeks could be subjected to a stigma and/or privilege based on the social classes comprising the educational contexts in which the concept of the Geek was understood. With respect to this topic, they concluded that a key issue in the evolving study of adolescent Geeks concerned "age and community as central to the negotiations around boffin/geek identities as assigned (negative) or adopted (positive)" (2012, p. 21), and argued essentially that, among other interrelated factors, social class played a role in a community's handling of the concept of the Geek, influencing their perception of the value of owning Geek capitals.

Because of the potential difficulties of capturing clear SES information from adolescents, especially those who may not have a clear grasp of these notions, an alternative measure of SES was employed: An assessment of the highest level of education attained by a parent or guardian. As access to advanced education is strongly related to social and economic advantage (McLoyd, 1989; Terenzini,

Cabrera & Bernal, 2001), these data were useful as an indirect measure of the socioeconomic status of the respondents.

Inseparable from, but distinct in its implications of, SES was the effect of *cultural background* as a personal factor affecting adolescent Geek identity transitions. Here, aspects of race and culture permeated not only the hierarchies of adolescent crowds – in fact, according to at least one study, adolescent crowds were most strongly representative of underlying ethnic and cultural populations (See Garner, Bootcheck, Lorr, & Rauch, 2006) and not other social factors – but there was also a long-standing characterization of Geek culture as being strongly associated with "white" (Eglash, 2002; Kendall, 2011) cultural elements. This simplified picture of the Geek as emulating the white culture, however, was far from complete. Stinson (2011) has pointed out that although being a Geek was related to the challenge of "acting white" in adolescent cultures, it was often better understood on its own terms, as being part of the overall difficulties of being a high-achieving minority student.

Finally, because a number of research groups, including both that of Francis, Read, and Skelton (2012) and Rentszch, Schutz, and Schroeder-Abe (2011), have reported an idealization of Geek students in the educational context as being, essentially, a classification of high-achieving student, it was thought important to include a predictive measure of adolescents' self-reported academic achievement. In this way, the implicit connection attributed to a focus on academic performance could be referenced in terms of its potential contribution toward the crystallization of the adolescent Geek identity.

Social support characteristics

Whereas the personal characteristics predictive of differences in adolescent Geek identity transitions were based in the study of Geek culture, the characteristics that describe social support draw largely from the literature of identity theory as a rationale for their inclusion. In this dissertation study,

the term *support* followed Petkus's (1996) formulation which, in turn, was drawn from the work of McCall & Simmons (1978). This narrow identity theoretic operationalization was expanded by drawing from the research of Young, Miller, Norton, and Hill who, in their (1995) work, compared available notions of support – intrinsic, extrinsic, and closeness – and found that, especially in the context of parent-child dyads, intrinsic support was the strongest predictor of long-term life satisfaction.

For purposes of the present study, then, a synthesis of these approaches was advanced: Making use of the terminology articulated in Petkus's (1996) model, I adapted the concept of interpersonal resources as a category of *actual resource* (as in Stets & Burke, 2014) defined by the four characteristics of *intrinsic support* (as in Young et al., 1995) available to adolescent Geeks which may influence the potency of their identity development. These four characteristics included traits like being "happy with", appreciating, being "interested in", and being "enthusiastic about" (Young et al., 1995, pp. 815-820) topics related to Geeks and Geeky activities.

These were then applied to social interactions that may be influential in the lives of young people, both in the context of their middle school education, and more pervasively in terms of being emotionally supported while undergoing the tumultuous vicissitudes of adolescent Geek identity transition.

Family support interactions, for example, have long been demonstrated to affect adolescent identity development, influencing outcomes as varied as capacity for role-taking (Cooper, Grotevant, & Condon, 1983), identity exploration (Grotevant & Cooper, 1985), sex role development (Bartle-Haring, 1997), and the ego identity of minority youth (Watson & Protinsky, 1988). With regard to adolescent Geeks in specific, there are reasons to believe that parental influences can have a strong effect, positive or negative, on a young person's desire to express Geeky traits (Archer et al., 2012), with perhaps the

best case scenario for young Geeks being illustrated in the situation of having a family member who can provide support as an "alpha" (see Woo, 2012, for a number of examples).

Peer support represented those influences of peer social interaction which described certain interactions pertaining to crowd identity. Classically, this might be thought of in terms of the contrasting role of the friendship circle or *clique* (see Milner, 2004 and Garner, Bootcheck, Lorr , & Rauch, 2006 for uses). However, following Tocci (2009), this idea has been expanded to encompass not only 'real world' interpersonal support, but also those of the "imagined communities" to which Geeks often belong. Here, the term applied to "self-defined geeks and nerds who recognize a sense of collective identity and shared values" (2009, p. 74) which may entail gaming groups, the regulars at a comic book shop, and even persons sharing an enthusiasm who meet up only by means of Internet communication.

And, finally, *educational support*, both that of teachers and administrators, has a definite ability to influence the social and emotional well-being of adolescents, most especially among them, high-achieving students (Cross, 2005; Hébert, 2011). For Geeks, the obvious corollaries of educational support are protections against the negative implications of their stigmatized identity: bullying and harassment (Charach, Pepler, & Ziegler, 1995; Thornberg, 2015). To the extent that the educational environment in which peer crowd identities evolve can buffer students from hurtful consequences of identity development, it may be thought that the context provides a positive influence to adolescent Geek identity development; in converse, this may imply that environments that fail to do so may prove to be an impediment.

Identifying additional descriptor variables

After some initial discussion and development of the instrument, items measuring two additional descriptor variables were added, as it became valuable to consider the *current age* of

respondents and *middle school start age*. There were a multiplicity of arguments for the inclusion of the items, among the strongest of which was that gathering this information might aid in the evaluation of a potential bias that might occur as a result of participants' reporting data retrospectively, as at least one variable in the study required. (See *Limitations of the Study* for details).

More moderate considerations were also given to the possibility that respondents may, for reasons otherwise unanticipated, have a significantly accelerated or delayed trajectory through their middle school education and thus might be outliers in terms of adolescent identity development relative to their cohort – being possibly in a different stage of development (as in Enright, Ganiere, Buss, Lapsley, & Olson, 1983; Dahl, 2004) or representing a variant trajectory in the pattern of development (as in Meeus, Iedema, Helsen, Vollebergh, 1999) – which could influence the analyses of other variables in the study. Capturing this data would allow for a reasonable means for evaluating such participants separately as outlier populations, should such a situation arise.

Adapting an outcome measure

Although it is reasonable to begin with the idea that some measure of creative behavior was necessary to capture the outcomes of creative identity development, there were, at first, no indications of which assessment strategy might have best served in the role. This led, logically, to a review of assessments of creative behavior. This followed from my initial position, most strongly influenced by the work of Lassig (2013), which recognized that adolescents were an understudied population in terms of their creative expressions and creative processes – and thus, care should be taken before blindly applying assessments that were not sensitive to the realities of adolescent development. Furthermore, and equally usefully, Lassig (2013) held the view that any conceptualization of creativity should contain

both elements that are domain-specific and domain-general, which was a position addressing a long-standing debate in creativity research (see Baer, 2012 for a review).

With these antecedents in mind, a review of available measures of creative behavior yielded a solution which exceeded the criteria in the most recent iteration of the Creative Activity and Accomplishments Checklist (CAAC: Paek & Runco, 2017) which revised Runco's (1987) version an instrument which had been previously developed by Holland (1961). This most recent version of the instrument innovated the CAAC paradigm by subdividing items in two ways: First, items were composed in six creative areas (music, writing, art, math/science, technology, and everyday creativity) which sampled both specific domains, and, as was argued in An & Runco (2016), provided a measure for domain-general creativity through the analysis of the final scale for "everyday" acts of creativity. Second, items were scored both for their quantity – the number of times the individual reported carrying out certain creative activities – and quality – the number of times they were recognized by others for their accomplishments.

This latter characteristic of the CAAC benefitted the study in that, by defining behaviors in the measure according to quantity and quality, the assessment would be based in a more stable set of fixed criteria (Paek & Runco, 2017). Among creativity researchers, it has long been the case that quantity and quality of ideas, variously positioned, have borne a significant relationship to the concept, reflecting the multidimensionality of the construct (Laske & Schroder, 2017). As reliable objective criteria, assessing creative behavior in reference to both quality and quantity avoided some of the more numinous, intricate challenges of pinning down the relatively complex definition of creativity (see Runco & Jaeger, 2012 for one account). Taken together, these aspects of the CAAC meant that the instrument could be scored in a variety of ways to look at both broad and narrow areas of creative behavior (see An & Runco, 2016 for an example).

Finalizing the survey instrument

Feasibility study

Having crystallized much of the user-generated survey instrument, an immediate concern was the question of whether items would work as intended. Would, for example, the semantic differential items cause confusion? Might the instructions be too difficult for participants to read? At nearly 100 questions, would the instrument take too long to complete? And, in an initial analysis, could differences – of the tentative sort, at least – be detected among the indicators of the constructs of interest?

These lingering uncertainties together promoted the idea that a feasibility study of the instrument might be a useful investment. And so, working across informal networks of Geeks, requests were sent out to individuals to participate by taking an early version of the survey instrument and to provide feedback about their experience. In all, roughly a dozen adult Geek participants were contacted in the local area using informal snowball recruitment techniques (as in Goodman, 1961). Although the expert "alpha Geeks" contributed by spreading news of the early feasibility study, they did not participate directly beyond facilitating recruitment.

Ultimately, eight individuals participated in the feasibility study. Their feedback provided good indication that neither the items nor instructions were a source of confusion. Commentary tended to focus on the overall high literacy rate of Geeks and the general familiarity of young people with online surveys. Further, the participants noted that the survey instrument did not take too long to complete. Brief analysis of survey metadata made available from the hosting site revealed that, aside from one participant who'd apparently left their survey to sit overnight, the average duration of engagement with the instrument was 15.7 minutes.

Early data analysis attended most heavily to issues of determining the potential of survey items linked to the indicators of adolescent Geek identity transitions as descriptors of a multiplicity of

developmental trajectories. If, for instance, the analysis revealed that all participants had similar scores across referent histories, such that the mean of crowd identity scores in both timeframes were the same or similar ($crowd_{t1} = crowd_{t2}$) or, likewise, if these conditions held with regard to role identity ($role_{t1} = role_{t2}$), such results might provide a basis for arguments against the utility of indicators. Another poor outcome might be realized if variation in the means of indicators demonstrated a unidirectional or fixed pattern of responses, such that the crowd identities and role identities were consistently and discretely descriptive of a single overall pattern of development.

Fortunately, basic analyses did not appear to confirm either problematic case. Even though eight participants would likely be too small a sample to test for all but the most extreme of mean differences, a series of one-way t-tests demonstrated an early trend toward statistical significance among indicators of role identity development. There was a non-significant, but positively trending, difference in the scores of previous Geek role identity (M=4.57, SD=9.67) and current Geek role identity (M=9.43, SD=7.21); t(6)=1.32, p=0.11. These differences were smaller with concern to the indicators of previous Geek crowd identification (M=45, SD=13.73) and current Geek crowd identification (M=45.42, SD=15.97); t(6)=0.14, p = 0.44.

Visual review of the general pattern of differences among the indicators confirmed that participants did not appear to be experiencing a unidirectional course through identity transition. For indicators of Geek crowd identity transition, there seemed to be a mix of relative stability, with some participants indicating they had been more strongly associated with the Geek crowd by their peers in middle school and roughly an equal amount indicating they had been less strongly characterized in this way. This is detailed in Figure 3 (below).

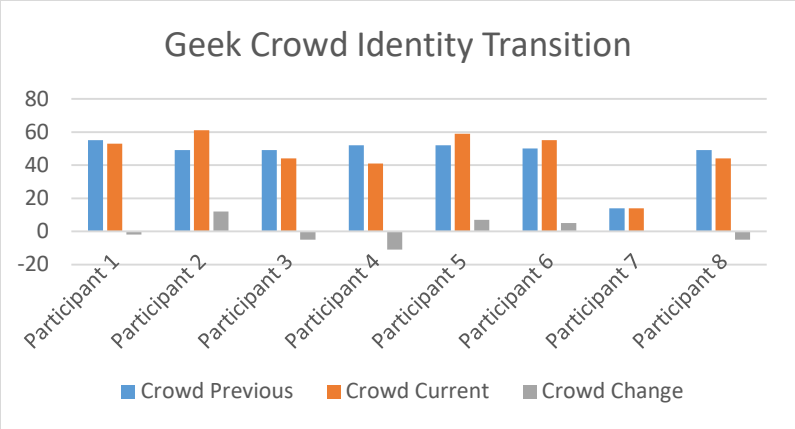

Figure 3

Geek crowd identity transition comparison

For the role identity development indicators, differences were much more obvious. Here, there were remarkable swings in the reported Geek role identities, with half of the participants indicating that they had made a significant transition away from the Geek role identity in adolescence. Still others maintained the same, moderate level of the Geek role identity, whereas a few demonstrated a stronger association with the Geek role identity in a circumstance which contrasted other participants. This is presented in Figure 4 (below).

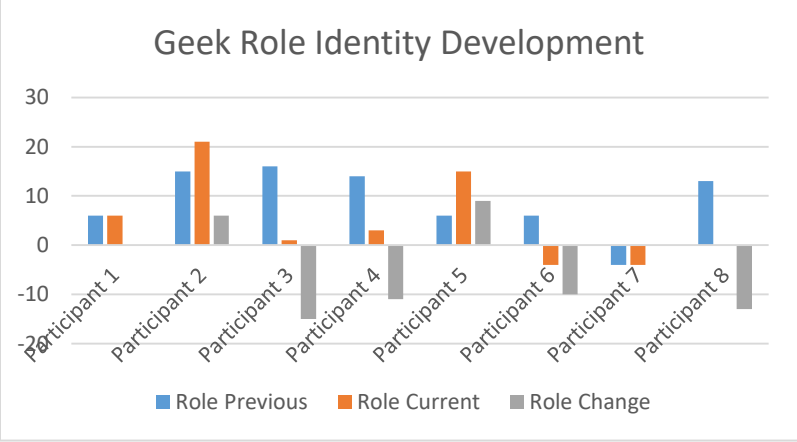

Figure 4

Geek role identity development comparison

Pilot study

As a final step in the instrument development process, it was considered sound practice to carry out a pilot study. Building on the procedures which had been implemented in the feasibility study, the key objective of this pilot study was to determine the utility of this study's analytic protocol (see *Data Analysis*), and most especially the cluster analytic procedure, as means of investigating the central research questions of the dissertation. The pilot would also help, to a considerably lesser degree, the process of fine-tuning items in the survey instrument and to work out any bugs in the participant recruitment process. Put directly: As the feasibility study had already been conducted to revise items on the survey instrument, the emphasis of the pilot was in refining the analytic protocol which would allow inferences to be drawn about the composite model of creative identity development.

Here, again, the pool of participants mainly consisted of adult Geeks; however, unlike with the feasibility study, the survey instrument was made available to a population that was mostly young adults and older adolescents. The processes of participant recruitment and data collection followed a fairly simple, straight-forward design: After receiving authorization to collect data from the University of Georgia's Office of Student Research, both for young adults and for minors with adult consent, I reached out to an "alpha Geek" who had offered the use of their Tumblr collective as a platform by which to inform potential participants.

Posts were sent out (blogged) from the main pages of two Tumblr communities, "Keranos, God of Stormcrows" and "Tales from the Commonwealth", explaining the study and inviting participation (see *Appendix B* to view these announcements). These were subsequently relayed by interested parties (reblogged), such that members of a number of related communities on Tumblr were contacted. In this way, the data collection process was similar to that employed in the recruitment of participants in the feasibility study.

A total of 128 full and partial responses were collected. Of those, 62 complete responses were analyzed and an additional 19 responses – those submitted by participants aged 18 and under – were reserved without analysis for use in the main study. Basic demographic data analysis for this sample population was carried out, some highlights of which were that the average age of the respondents was 22.26 years, the youngest retained response age in the pilot sample was 19, and the oldest was 42.

The majority of respondents were female, with just under half of the responses (45%) coming from participants who identified this way. Males comprised a smaller portion of the sample (32%), and, among responses, the smallest group (23%) consisted of those who chose not to identify their gender. Self-reported ethnic characteristics of the respondents were broadly gathered utilizing an open-ended response option and then coded for major trends. Following this paradigm, just under half (48%) of respondents identified as “white”, with the second largest group (34%) identifying with greater complexity as having an “other/non-categorical” ethnicity, even smaller was the group that responded as having a mixed or multiethnic identification (8%), with the smallest groups being Latino (2%), and Asian (2%).

Next, a descriptive analysis of each quantitative variable was then carried out to confirm normal distribution of the sample data and to rule out the effect of univariate and multivariate outliers. These (kurtosis, skew metrics, etc.) were all fine, demonstrating no anomalous influences, and there were no significant outliers in the sample.

Analysis continued with the generation and validation of a cluster model which could holistically represent the developmental trajectories of adolescent Geek identity transition. Herein, making use of k-means cluster analysis, I selected multiple means to start with, working from two, three, four, and five groups as starting points under the expectation that they might find a greater or smaller number of identity transition conditions than initially reported.

This produced a great deal of comparison data and some interesting cases at two and three groups which were noteworthy, but unstable, and a five-cluster model which was promising, but which also contained an aberrant group with only 3 participant results. As such, the cluster model was ultimately defined as a four group model with cluster sizes of 11, 20, 23, and 8 participants.

As with Luyckx, Goossens, Soenens, Beyers, & Vansteenkiste, (2005) and later authors, I utilized a one-way MANOVA to determine if the indicators were statistically significantly different for each of the groups, a proposition which was affirmed by the analysis: F (12, 145.808) = 19.453, $p < .0005$; Wilk's $\Lambda = 0.80$, partial $\eta^2 = .570$. Additionally, the model was compared to the results of a two-step cluster solution to confirm that the pattern of responses would conform to expectations under the conditions of variant analysis. A comparison of the cluster sizes and centers suggested that the four-cluster solution was a stable result of both clustering methods.

Visually, the four-cluster model offered a clear representation of the identity transitions in a manner extraordinarily near to those which had previously been summarized from ethnographic data. I labeled the four cluster groups as: Cluster 1 = “Liminal”, Cluster 2 = “Embraced”, Cluster 3 = “Normalized”, and Cluster 4 = “Balanced”. (See Figure 5, below).

This naming convention largely followed terms used in prior ethnographic studies of adolescent Geeks, save for the “Liminal” label, which was applied instead of a “Non-Geek” label (as previously promoted in the *Review of the Literature*) in recognition of the fact that (a) certain participants in the pilot study may have self-selected to respond based on the terms used in announcement material which clearly indicated this was a study of Geeks, and (b) that there was already such a category of Geek, identified by implication in works like Kendall (1999), Bishop et al. (2003), and Jackson (2014), grouping those individuals who considered themselves to have a poor affinity with the Geek crowd, but, which, to a stronger degree, might otherwise still consider themselves to partially exist in a Geeky role.

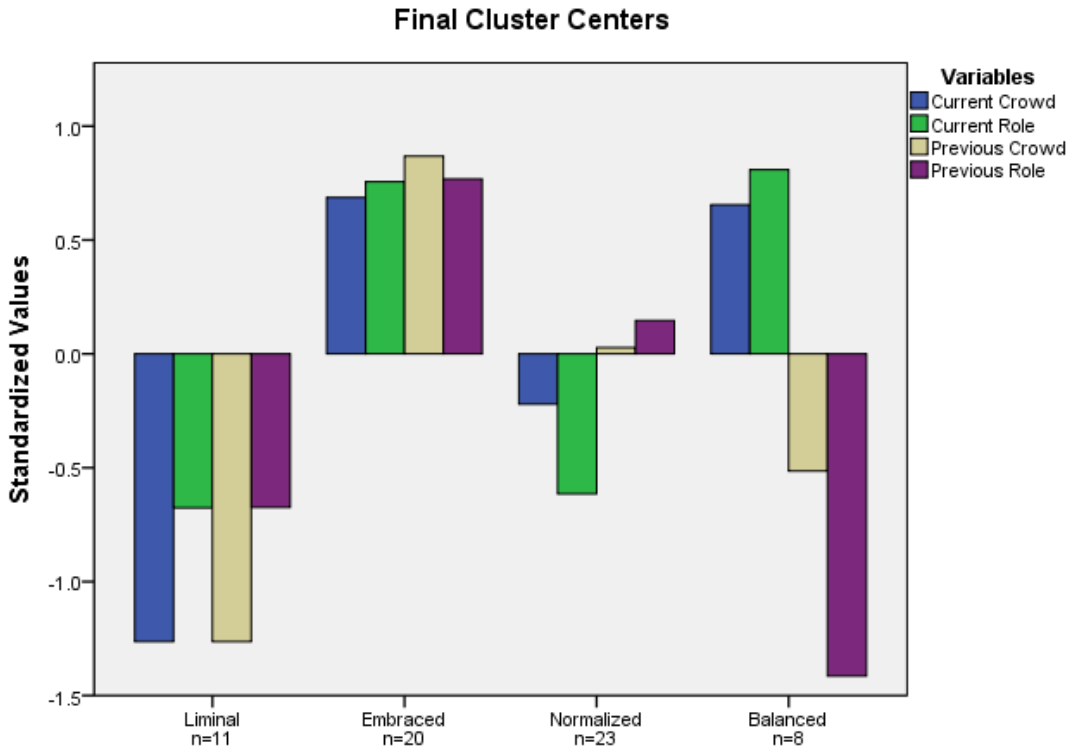

Figure 5

Four-cluster analytic solution describing adult Geek identity transitions (N=62)

The results of this analysis would be informative to the main study, which made use of a comparative strategy for cluster analysis validation, whereby data from a younger Geek group would be analyzed using the same procedure to determine the validity of the cluster results and cross-referenced to the adult data to draw additional inferences. (See *Data Analysis* for more).

Having thus modeled the developmental pathways of adolescent Geek identity transition as identity transition clusters, it was then possible to tentatively orient these variant trajectories according to the composite model of creative identity development, investigating the predictors and outcomes postulated in the conceptual model based on data gathered in the pilot study.

The first relationships in the composite model to be investigated were those potential influences on adolescent Geek identity transitions among the personal and social support predictors. Given the relatively large number of predictors, a step-wise reductive strategy was employed to create a multinomial logistic regression model utilizing cluster groups as the dependent variable. This entailed creating a full model for the nine predictors and subtracting weakly predictive variables one at a time to obtain the strongest significance for model fit statistics.

Following this method, a trial model for the relationship containing two predictors – the "Age" variable and the "P/G Education" variable – was produced. It was found to be a minimally good fit for the data, $\chi^2(51, N = 62) = 24.727$, Nagelkerke $R^2 = .355$, $p = .054$. The total estimated correct prediction rate for the model was 45.2%. Goodness of fit tests were conducted with the use of a Pearson goodness-of-fit test and a deviance test. These both demonstrated non-significant findings, indicating that the model was a good fit.

Of the two predictors, the "Age" variable was the stronger contributor, $\chi^2(3, N = 62) = 10.198$, $p = .017$, and "P/G Education" was marginal at $\chi^2(12, N = 62) = 20.503$, $p = .058$. Group comparisons for the significant predictor, "Age", demonstrated an effect whereby the likelihood of being in the "Balanced" group was multiplied by roughly 1.5x for each standard deviation's worth of increase in "Age" by comparison to all three other identified clusters. No other significant intergroup effects were determined in this model.

These findings highlighted the difficulty of modeling the predictors with the adult participant sample, but made a preliminary case that older participants in the pilot sample were statistically more likely to identify with the Balanced group of Geeks. Indeed, following up with a visual inspection of the data, the mean age for participants in the Balanced group was 24.88 years, whereas ages for members in the other groups averaged 21.36, 21.85, and 22.13 years, respectively.

Finally, the effect of identity transitions on creativity was examined. Here, analysis was carried out by using membership in the four cluster groups as a fixed variable and conducting a series of one-way MANOVAS on the data gathered utilizing the six domains of the CAAC. There were a number of statistically significant findings which are outlined in Table 10 (below):

Table 10

Descriptive statistics and mean differences in CAAC scores by adult transition cluster (N=62)

Variable	Liminal		Embraced		Normalized		Balanced		*F*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Multivariate[a]									.041*	.162
Writing	-0.55	0.84	-0.12	1.04	0.35	0.94	0.03	1.04	.087	.106
Music	-0.11	0.72	-0.12	1.08	0.25	1.09	-0.29	0.83	.474	.042
Art	0.03	1.16	-0.01	0.88	0.17	1.12	-0.50	0.62	.456	.044
Science/Math	-0.53	0.66	0.00	1.00	0.46	1.10	-0.58	0.19	.011*	.174
Technology	-0.46	0.81	0.02	1.12	0.35	0.99	-0.42	0.56	.081	.109
Everyday	-0.63	0.45	-0.18	1.07	0.57	0.82	-0.33	1.14	.002**	.222

[a] Multivariate analysis used Wilk's multivariate criterion

*p < .05, ** p < .01

Post hoc analyses using Tukey's HSD indicated that in the science/math domain participants in the Liminal group (M=-.53 SD=.66) expressed less creative behavior than participants in the Normalized group (M=.46 SD=1.10), a finding significant at p = .028. Similarly, participants in the Balanced group (M=-.58 SD=.19) also had significantly lower scores than those in the Normalized group (M=.46 SD=1.10), a finding significant at p = .042.

Group differences in the everyday creativity of participants were found between Geeks in the Normalized group (M=.57 SD=.82) and both the Liminal group (M=-.63 SD=.45) and the Embraced group (M=-.18 SD=1.07), the general pattern of which indicated significantly higher self-reported everyday creative behaviors in the Normalized group than either other group, with mean differences significant at p = .003 and p = .042, respectively.

The value of these findings was two-fold: First, they demonstrated the four-cluster model's utility in determining broad differences in creative behavior within at least one creative domain and

with respect to a measure of general creative activity. Second, the model was useful in describing differences in the pattern of creative behaviors engaged by Geeks in different transition groups, with the provisional data indicating that Normalized Geeks in the pilot study displayed an affinity for creativity in the science and math domains relative to Liminal and Balanced Geeks and that, in turn, Balanced Geeks were more creative in everyday activities than both Liminal and Embraced Geeks.

Participant Population

The population examined in this study was composed of adolescent Geeks, the majority of which were in middle school and early high school. Participants were contacted by means of announcements made in two venues: First, as in the pilot study, adolescent Geeks were contacted through the medium of a small number of online fan communities; second, announcements were made to sixth, seventh, and eighth-grade students at two middle schools in a large county in north-central Georgia.

From the two populations sampled, a total of 173 responses were recorded, and, of these, 112 surveys were completed to a sufficient degree to warrant continued investigation of responses. In the final analysis, however, this number was increased to 131 for the reason that, in the pilot study, a minimum respondent age of 19 was imposed to constrain the data set. As such, the 19 reserved responses which were not previously analyzed in the pilot were combined with responses to the main study to enrich the participant pool and improve sampling adequacy. As adolescents were uniquely targeted in the study, a limited age range was represented in the final participant sample, with a minimum age being 12 and a maximum being 18, with the mean being roughly 14.6 years.

Respondents reported a diverse plurality in their gender identities, with 37% responding as male, 50% responding as female, and 13% indicating they did not, or would not, choose to identify as a binary gender. Cultural data were similarly broad. In the simplest analysis, the majority group (33%)

provided a potpourri of responses which could not be easily categorized; these ranged from no response to whimsical identifications, some of which included “red neck” and “I have a grampa.” The next-largest group of respondents (28%) indicated generally that they were plainly “American” or “American culture”, and the third-highest set of responses (24%) indicated they were some variant of White and of European descent. Further, there was a sizeable sub-population (8%) within the sample of individuals who identified as being from a mixed culture or multicultural heritage. Much smaller numbers were reported for Asians (2%) and Latinos (5%).

As the sample population were tasked with recalling moments from their student experiences, data were requested concerning the highest level attained by a parent/guardian and a self-report of respondents’ academic performance. In the case of the former, a majority of respondents (34%) indicated that a parent/guardian had earned a college-level diploma, with the next-highest response category (27% of responses) being an indication that a parent/guardian had attended graduate school. With regard to self-reported academic success, the largest category of response (34%) was one indicating fairly strong academic success, describing themselves as earning “many As.” Smaller proportions continued throughout the self-reported grade spectrum, with the smallest percentage (5%) being for those who described themselves as earning “no As.”

A summary of these characteristic data of the participant population have been composed into a table (Table 11, below) for ease of reference.

Table 11

Personal characteristics of study respondents (N=131)

Variable		Value	
Age		M = 14.65	SD = 1.77
Middle School Start		M = 11.41	SD = 1.04
Gender			
	Male	n = 44	36.6%
	Female	n = 65	49.6%
	Other	n = 18	13.7%
Cultural Background			
	White	n = 31	23.7%
	American	n = 37	28.2%
	Latino	n = 6	4.6%
	Asian	n = 3	2.3%
	Mixed/Multiculture	n= 11	8.4%
	Other	n= 43	32.8%
P/G Education Level			
	Some High School	n = 18	13.7%
	High School Diploma	n = 11	8.4%
	Some College	n = 22	16.8%
	College Degree	n = 44	33.6%
	Graduate Degree	n = 36	27.5%
Academic Performance			
	All As	n = 24	18.3%
	Many As	n = 44	33.6%
	Some As	n = 35	26.7%
	A Few As	n = 21	16.0%
	No As	n = 6	4.6%

Data Collection

The process of data collection for this study was based on the Tailored Design Method (as in Dillman, Smyth, & Christian, 2009) which intended to mitigate survey error by creating social exchanges that were positive and which would build trust with potential respondents. Expecting that some hesitation may result from the combined challenges of locating adolescent Geek populations, wherein members may feel disinclined to participate on the basis of a perceived stigma, the study made use of a

full and communicative process of engaging in multiple contacts at multiple sites through multiple media. For these reasons, the announcement and recruitment of participants occurred over four phases from August 2017 to early November 2017.

Throughout all four phases of data collection, members of the participant communities were offered the opportunity to participate by the community manager, a volunteer blogger or educator, in their social context – a trusted resource and organizing voice in the community – and were assured that every reasonable step had been made in insuring the anonymity of survey responses. Further, as the participants were expected to be under the age of 18, parental permission to participate, as well as personal assent – the latter being sought by all participants – was requested. Throughout the process, potential participants were informed that participation was entirely voluntary, and they were free to end participation at any time without consequence. (See *Appendices B and C* for announcements requesting participation and consent forms).

The emphasis in the requests for participation for the first phases of the study differed in a small, but meaningful, way from those latter two phases. In the first case, an emphasis was made in just recruiting adolescents from a small digital community sampled earlier in the pilot study. This time, however, an emphasis was placed on the recruitment of adolescents, with a maximum age for participation being listed as 18. In the latter case, authorization for a similar type of participant recruitment was sought at the county and school level and then, through the intermediary of classroom teachers, middle school students were approached. Half of the student responses were gathered from a public gifted middle school magnet program, whereas the other half were gathered from a normal public middle school program. In both situations, students were recruited across grade levels, from 6th through 8th grades. In total, a pool of potential participants numbering just over 200 was authorized by the two schools and 76 responses were recorded, which constituted roughly a 38% response rate.

Data for the study were collected through use of a self-administered, online survey service maintained by a third party (Qualtrics) via a link embedded in the announcement materials. Through these means, the relative safety and confidentiality of data were supported and other advantages were conferred more generally to the study: These included ease of exporting data for analysis, ease of styling and formatting the survey instrument, and continual availability of the survey instrument during data collection. Further, as the young Geek culture is highly digitally literate (McArthur, 2009) this choice provided a good fit between the needs of the study and the skillsets of participants.

Data Preparation

Data from the 131 participant responses were exported from Qualtrics into an Excel spreadsheet for coding, cleaning, and standardizing. All data were then evaluated in SPSS to determine univariate and, where it made sense, multivariate outliers. Finally, identity data, being that they were the product of a novel instrument, were then examined to determine the distributional characteristics of the data, potential collinearity of variables, and reliability of items on the instrument.

Coding was carried out for three variables, the most complex of which was cultural background which consisted of creating six categories to describe the open-ended responses solicited from respondents. These six categories were, at length, simplified to “White”, “American”, “Latino”, “Asian”, “Mixed/Multicultural”, and “Other.” This was necessary because, although a few took seriously the opportunity to describe a cultural background in a more personal way, the majority of respondents either used those basic categories or did not respond in a sensible manner.

Data were cleaned by using a procedure in Excel to impute mean scores for responses that were left blank by respondents. Even though very few respondents completed the study with a large streak of

such voids, a dozen respondents did miss at least one question. Also, two respondents skipped an entire domain, apparently accidently. In all these cases, mean scores were imputed for the missed items.

At this stage, too, five variables were cleaned by converting them into more readily useable form: The “Age” and “Middle School Start” variables, which were collected by asking the year at which the participant was born and the year at which they started middle school, were changed to simple numerical values. Similarly, “Grades”, “Current Geek Role”, and “Previous Geek Role” were score-reversed, such that a higher score on the scale indicated greater affinity for the Geek identity.

Next, data were standardized, as was recommended – with some caveats (see Henry, Tolan, & Gorman-Smith, 2005) – for continuous predictor variables (age, middle school start, and the three support variables), variables to be used in cluster analysis, and variables in the CAAC. Given that the scales for crowd identity and role identity were highly dissimilar, and further given that the CAAC scales were dissimilar from both, the argument for standardization was found reasonable. Although a z-score transformation has, in some cases, been considered inferior to other methods – especially in comparison to a range transformation (Milligan & Cooper, 1987) – the facility, utility, and compatibility of the z-score transformation rendered it the stronger option.

Data were then assessed to eliminate potential outliers, both of the univariate and multivariate sort. In the first case, univariate outliers were examined in Excel by searching out extremes in the standardized scores. In the second case, a Mahalanobis distance metric, calculated using SPSS version 24, was employed to judge the possibility of multivariate outliers. Though there were some close cases, no responses were eliminated for the reason that they were found to be outliers.

In the evaluation phase, the first step of data preparation was to investigate the distributional characteristics of the three unstandardized social support predictors and the four unstandardized

adolescent Geek identity transition variables. Here, means and standard deviations were examined, as well as determinants for skew and kurtosis (see a summary on Table 12, below).

Table 12

Distributional characteristics of unstandardized identity and support variables

	M	*SD*	Skew	Kurtosis
Current Crowd	46.086	8.117	-.153	-.117
Current Role	30.134	7.507	-.316	-.559
Previous Crowd	45.903	8.893	.125	-.178
Previous Role	32.310	8.425	-.013	-.544
Family Support	12.838	4.665	-.065	-.977
Peer Support	13.985	5.211	-.517	-1.004
Educational Support	13.455	4.221	-.141	-.645

On the whole, these preliminary distributional analyses suggested no immediate impediment to further statistical evaluation for the study. Among the seven variables analyzed, peer support was notable as being moderately skewed and moderately platykurtic, but neither this variable nor any of the others evaluated were significantly beyond the acceptable ranges to be considered approximate to a univariate normal distribution.

Following this, the second evaluative step was to carry out a series of bivariate correlations in order to judge the potential confounding influence of collinearity among identity variables which may have inhibited later cluster analysis (Sarstedt & Mooi, 2011). The results of these analyses are presented in Table 13 (below). Generally, as none of the correlations were unduly strong, the results of this procedure indicated that collinearity would not be an impediment to further analyses of these variables.

Table 13

Intercorrelations among identity transition scales

	Current Crowd	Current Role	Previous Crowd	Previous Role
Current Crowd	1	--	--	--
Current Role	.329**	1	--	--
Previous Crowd	.635**	.200*	1	--
Previous Role	.177**	.497**	-.436**	1

*p < .05, ** p < .01

The final step of evaluative data preparation was to determine the reliability of the adolescent Geek identity transition scales. Because the way in which the scales were scored, which had implications for which metric may be best for assessing reliability (Ercan, Yazici, Sigirli, Ediz, & Kan, 2007), two differing methods of analysis were employed at this phase. In the case of the crowd identity scales, Cronbach's (1951) alphas were calculated in SPSS, but in the case of the role identity scales McDonald's (1999) omegas were evaluated using a tool in the 'Psych' package in RStudio version 1.0.143. Notably, this latter decision was influenced by a suggestion that appeared in Burke & Casts's (1997) work detailing the use of semantic differential scales as measures of role identity, wherein omegas were promoted as the preferred reliability statistic.

The results of these reliability analyses were very positive, with reliability values for both types of scale being in excess of .75. These reliability values, both for totals and individual scales are presented in Table 14 (below).

Table 14

Reliability of adolescent Geek identity transition scales

Scale	Number of Items	M	SD	Reliability Value
Crowd Identity Total	28	91.99	15.38	α = .847
Current Crowd Identity	14	46.09	8.12	α = .753
Previous Crowd Identity	14	45.91	8.89	α = .757
Role Identity Total	14	49.56	13.79	ω = .860
Current Role Identity	7	25.87	7.51	ω = .860
Previous Role Identity	7	23.69	8.43	ω = .840

Data Analysis

As with many other facets of this dissertation, the data analysis procedure was the culmination of iterative revisions, building from earlier works, and integrating aspects of related methods of

psychometric inquiry. Specifically, the data analysis protocol for this study was, with some effort, distilled from a cluster analytic procedure described in the works of Luyckx et al. (2005), Luyckx et al. (2008), and Schwartz et al. (2011). It was then modified for use in this present study, a process which included adaptation for use with the indicators of adolescent Geek identity transitions, as well as alterations intended to streamline a comparative method of validating the cluster solution.

As with the present study, the purpose of determining a cluster solution in the prior studies was to generate an empirically-based framework for describing the outcome states – or "statuses" (Marcia, 1980) – of adolescent identity development, such that the multiple underlying dimensions of development were better represented in a "data-driven manner" (Luyckx et al., 2005), as opposed to a purely theoretical derivation. To provide a very brief description of the prior procedure: Initially, in the works of Luyckx et al. (2005) and Luyckx et al. (2006), four dimensions of adolescent identity development were clustered with the intention of confirming at least four statuses like those which had been previously described in the Identity Status Theory (IST) paradigm (see Marcia, 1993; van Hoof, 1999); instead, the researchers retained five statuses, which was thought to be a qualitative refinement to the overall model (Luyckx et al., 2005). Later, the procedure was replicated with an additional dimension, which now yielded six status of identity development (Luyckx, Schwarts, Soenens, Vansteenkiste, & Goossens, 2010).

Across the family of prior studies, a general set of analytic steps were followed: Data were collected on the indicators of the dimensions of adolescent development, a factor analysis was conducted to verify those dimensions in the study sample, then, utilizing indicator data, a series of cluster analyses was carried out to determine the best fit of clusters, and, finally, MANOVAs were carried out on criterion variables to externally validate the cluster solution. (See Luyckx et al., 2010 for an example). Broadly, these steps conformed to the best practices of cluster analysis, some of which included utilizing theoretically driven measures, investigating multiple cluster solutions, and validating

the cluster solution by both confirming the model with a second sample and by testing the model using a criterion measure (see Henry, Tolan, & Gorman-Smith, 2005 for an in-depth discussion).

Here, the value of the cluster analytic methodology was readily apparent: First, clustering provided a means by which to represent the multiplicity of developmental trajectories postulated – each cluster could serve as a state describing a certain concurrence of crowd and role identity development; second, it provided a medium by which to confirm the internal nature of the adolescent Geek identity transitions – as the number of clusters could vary, it could, in fact, provide empirical evidence to further establish the known transitions; and finally, it could be positioned central to the larger framework of the composite model of the development of creative behavior such that both the potential influence of predictor variables and outcome variables might be examined with relative ease.

Working from these propositions, I refined the IST cluster analysis process into a 3-step analytic protocol for use in the present study, the whole of which is presented in tabular form (below):

Table 15

Data analysis protocol

Cluster analysis
Validation of the cluster solution
Predictor analysis
Analysis of personal characteristics
Analysis of social support
Outcome analysis
Quality analysis
Quantity analysis

Following this protocol, data analysis was carried out on the set of 131 collected participant responses utilizing SPSS version 24. The outcome of those analyses are presented in a later chapter (see *Discussion of the Findings*), wherein they are organized by the research question they addressed. However, the presentation of results does follow the step-wise progression, flowing from cluster analysis to multivariate and univariate analyses, of the protocol as it was detailed here.

Specifically, *Research Question #1* was addressed utilizing elements from the first step in the data analysis protocol, relying on cluster analysis and follow-up validation of the cluster solution. As such, assessment of the nature of adolescent Geek identity transitions entailed the generation and comparison of a series of cluster analyses. Each cluster model would then be validated using methods referenced in the work of Luykcx et al., (2005), as well as those suggested in both Henry, Tolan, and Gorman-Smith's (2005) and Sarstedt and Mooi's (2014) work. In sum, these were considered to be a comparative cluster analysis whereby alternative models were generated both using a k-means procedure and a two-step process for which a multitude of comparisons were made across model types for both the data from the main study and the cluster solution for an older, alternative Geek population generated previously (see *Pilot Study*, above).

Research Question #2 was examined from the position of determining the influence of personal characteristics and social support on the trajectories of adolescent Geek identity transition. Following the logic presented at the beginning in this chapter (see *Concept clarification*), these analyses made use of multinomial logistic regressions, whereby the identity transition groups would serve as dependent variables and predictive characteristics, for both personal and support, as independent variables.

And, finally, *Research Question #3*, was investigated in a small sequence of stages, starting broadly with a one-way MANOVA analysis of the six creativity domains wherein the cluster group served as an independent variable. The creativity response data were then subdivided into quantity and quality scores for a more fine-grained analysis. This followed the previously-described process of conducting a one-way MANOVA of the 'quality' and 'quantity' creativity measures, whereby, as earlier, cluster groups served as an independent variable.

CHAPTER IV

FINDINGS

The purpose of this survey study was to investigate adolescent Geeks' identity transitions, predictive influences on the identity transition, and their potential to influence the creativity of young people.

Three questions guided the study:

1. What is the nature of adolescent Geek identity transitions?
2. What are the personal and support predictors of adolescent Geek identity transitions?
3. To what extent do adolescent Geek identity transitions influence expressions of creative behavior?

Findings Related to Research Question #1

The first research question examined in this dissertation study was "What is the nature of adolescent Geek identity transitions?" Implicitly, efforts to answer this question contained within them considerations of the manner in which the variant developmental trajectories of adolescent Geek identity transitions might be empirically validated, as well as concerns about the number of transition statuses that might be confirmed through data-driven means. As described previously (see *Data Analysis*), this analytic process was based in the creation, selection, and subsequent validation of a cluster model.

To begin with, four separate k-means cluster analyses – postulating 2, 3, 4, or 5 possible transition statuses – were carried out composing the standardized scores of all four adolescent Geek identity variables into a variant number of groups describing different combinations of previous identity and current identity orientation.

Initial evaluation found ample evidence to support models for all five grouping options, a situation which was notable for challenges raised by having numerous, but relatively poor, statistical remedies (Jain, 2010). For reasons much like those apparent in this circumstance, Jain and Dubes (1988) have argued that the validity of cluster solutions should be based on different types of validation criteria, including analysis of internal, relative, and external validity. Although internal clustering methods proposed a model-based criterion to determine the fit of the data, relative and external validity are instead based on model comparisons and *a priori* (or theoretical) evaluations (Jain & Dubes, 1988).

Following these insights, theoretical and comparative evidence were employed in the model selection process. Here, two questions dominated the selection of a final cluster solution: These were (a) "What number of clusters would best match available theoretical evidence of adolescent Geek identity transition states?" and (b) "In what ways could pilot data collected from an adult Geek participant sample inform a study of adolescent Geeks?"

Given that the theoretical conditions of adolescent Geek identity transitions promoted four variant pathways of adolescent Geek identity transition (see *Review of the Literature*) and that the pilot study found strong evidence favoring a four-cluster solution (see *Pilot Study*), the final decision at this stage of the study was to adopt the four-cluster solution to describe the adolescent sample, as well.

A graphical depiction of these four final clusters is presented in Figure 6 (below), and as a descriptive summary of the cluster groups (Table 16, below), wherein the groups are detailed in terms of

variant levels in the indicators and nominated according to their characteristics in terms of known adolescent Geek identity transitions. Cluster labeling was informed by an earlier procedure carried out during the pilot study (see *Pilot Study* for more), yielding four status group denominations: Cluster 1 was "Liminal", Cluster 2 was "Normalized", Cluster 3 was "Balanced", and Cluster 4 was "Embraced". Importantly, as in the pilot, the labeling for the first group, "Liminal", differed from the hypothesized outcome state – which would have otherwise been "Non-Geek" – in recognition of the possible joint influence of the stigma of the label and self-selection bias (see *Discussion of the Findings* for more).

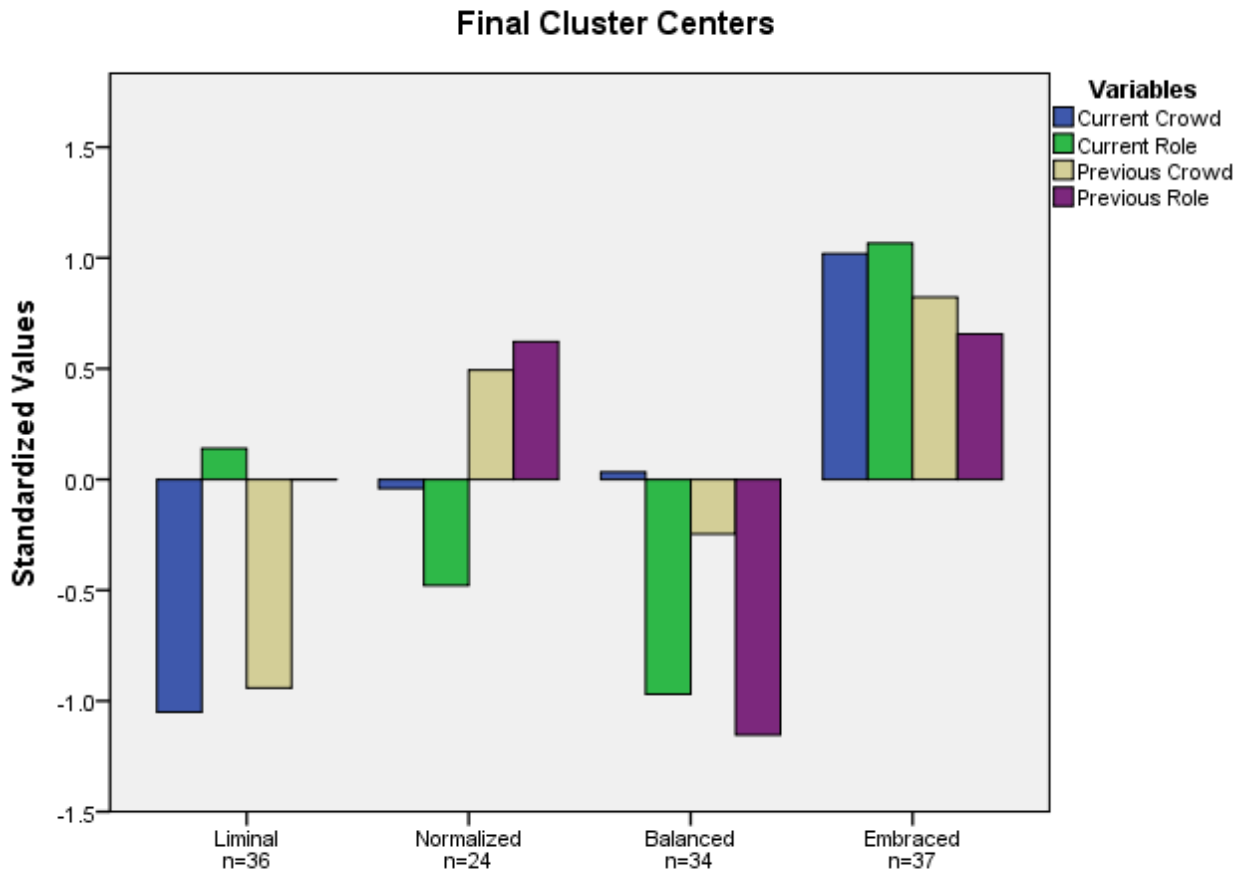

Figure 6

Four-cluster analytic solution describing adolescent Geek identity transitions (N=131)

Furthermore, in the latter summary, indicator levels delineating the transition statuses were heuristically categorized for ease of articulation and later discussion. These were roughly thought of as being in the "average" range if the standardized value for the cluster centers were between about -.5 and .5, "moderately low" if the scores were between about -1.0 and -.5 and "moderately" high between about .5 and 1.0, and "very low" if they were lower than -1.0 or "very high" for higher than 1.0. In some cases, the values were close enough to provide two approximate descriptions for an indicator.

Table 16

Labels, standardized cluster center values, and descriptions of the adolescent Geek identity transitions

Cluster	Label	Indicator Values	Description
I	Liminal	CC: -1.051	CC: Very Low
		CR: 0.140	CR: Average
		PC: -0.942	PC: Moderate to Very Low
		PR: 0.000	PR: Average
II	Normalized	CC: -0.041	CC: Average
		CR: -0.479	CR: Moderately Low
		PC: 0.494	PC: Moderately High
		PR: 0.622	PR: Moderately High
III	Balanced	CC: 0.033	CC: Average
		CR: -0.970	CR: Moderate to Very Low
		PC: -0.247	PC: Average
		PR: -1.153	PR: Very Low
IV	Embraced	CC: 1.019	CC: Very High
		CR: 1.066	CR: Very High
		PC: 0.823	PC: Moderate to Very High
		PR: 0.657	PR: Moderately High

CC – Current Crowd; CR – Current Role; PC – Previous Crowd; PR – Previous Role

Having thus been selected and modeled, the four-cluster solution was then further evaluated to provide evidence of internal and relative validity. This was a two-step process, wherein (1) a one-way MANOVA was carried out on indicators to confirm that cluster centers were statistically different for each group, and (2) the data were reanalyzed using a two-step clustering procedure and evaluated in terms of cluster size and final cluster center location.

And so, I first made use of a one-way MANOVA to confirm that the indicators of adolescent Geek identity transition were sufficiently discriminant in the four-cluster solution. Statistical findings supported this notion, as a statistically significant difference among the means of all groups was found at the $p < .001$ level: F (12, 328.365) = 41.760, $p < .0005$; Wilk's $\Lambda = 0.086$, partial $\eta^2 = .558$.

The data set was then re-analyzed via a two-step cluster solution. The final cluster solution for this method (see Table 17, below) varied to a small degree in the number of participants in each group, but the analysis supported the inference that the overall constitution of the clusters was largely independent of clustering method, demonstrating a pattern of relative indicator means in all four clusters like those in the k-means cluster solution.

Table 17

Final cluster centers for the alternative, two-step method describing adolescent Geek identity transitions (N=131)

	Liminal (n=51)	Normalized (n=28)	Balanced (n=29)	Embraced (n=23)
Current Crowd	-.81	.86	-.04	.80
Current Role	.01	.83	-1.22	.52
Previous Crowd	-.67	.32	-.26	1.43
Previous Role	.03	.03	-1.15	1.35

Findings Related to Research Question #2

The second research question examined in this dissertation study was "What are the personal and contextual predictors of adolescent Geek identity transitions?" Situating personal and support characteristics as predictors of adolescent Geek identity transition, these data were analyzed by means of a multinomial logistic regression model wherein transition clusters served as the dependent variable.

An initial model for the relationship containing all nine predictors was produced. It was found to be a good fit for the data, $\chi^2(51, N = 131) = 77.278$, Nagelkerke $R^2 = .476$, $p = .01$. Among predictors in the model, the most significant contribution (summarized in Table 18, below), was made by the self-reported "Academic Performance" variable, with the "School Support" variable, "Peer Support" variable, and "Gender" variables tending toward statistically significant, but falling outside the traditionally-accepted $p < .05$ level of statistical significance. For this model, goodness of fit tests were conducted with the use of a Pearson goodness-of-fit test and a deviance test. These both demonstrated non-significant findings, indicating that the model was a good fit. However, these results were taken to be considered only a tentative assessment, as the software indicated that, because of the number of categories in the variables, the validity of such metrics was uncertain.

Table 18

Predictors' unique contribution to the full multinomial logistic regression model (N=131)

Predictor	χ^2	*df*	*p*
Age	0.936	3	0.817
Middle School Start	1.3	3	0.729
Academic Performance	21.709	3	0.000**
Gender	7.842	6	0.250
Parents' Education	9.804	12	0.633
Cultural Background	8.985	15	0.878
Family Support	3.542	3	0.315
Peer Support	4.424	3	0.219
School Support	5.362	3	0.147

*p < .05, ** p < .01

The initial model displayed relatively good predictive ability overall, with an estimated correct prediction rate of 56.5%, a stronger correct prediction rates for the "Embraced" group (70.3%), and a weaker, but still moderate, correct prediction rates for the "Liminal" group (55.6%), the "Normalized" group (37.5%), and the "Balanced" group (55.9%).

Group comparisons were made to determine the effect of these predictors by orienting the "Liminal" cluster as a referent, as, among the four clusters identified in the analysis above, it was the

group that was the most consistently representative of members with the lowest scores for Geek crowd identity and Geek role identity, arguably being the closest to a "Non-Geek" comparison cluster. To facilitate interpretation, the continuous predictor variables in the model were standardized. Parameter estimates for the group comparisons are presented (on Table 19) below:

Table 19

Initial parameter estimates contrasting the "Liminal" group versus each other cluster group (N=131)

Predictor	Liminal vs.	*B*	*SE*	*OR*	*p*
Age	Normalized	0.193	0.223	1.213	0.387
	Balanced	-0.008	0.216	0.992	0.97
	Embraced	0.047	0.207	1.048	0.821
Middle School Start	Normalized	-0.131	0.295	0.877	0.656
	Balanced	-0.066	0.308	0.936	0.831
	Embraced	0.19	0.293	1.21	0.516
Academic Performance	Normalized	-0.327	0.33	0.721	0.321
	Balanced	0.367	0.314	1.443	0.243
	Embraced	1.201	0.366	3.323	0.001**
Gender (Male)†	Normalized	-1.39	1.046	0.249	0.184
	Balanced	-0.649	1.137	0.523	0.568
	Embraced	-1.959	0.964	0.141	0.042*
Parents' Education (Earned BS/BA)†	Normalized	-0.75	0.854	0.472	0.38
	Balanced	-1.606	0.726	0.201	0.027*
	Embraced	-0.676	0.791	0.509	0.393
Cultural Background (American)†	Normalized	0.297	0.805	1.346	0.712
	Balanced	0.555	0.687	1.741	0.419
	Embraced	0.523	0.753	1.686	0.488
Family Support	Normalized	0.188	0.357	1.207	0.598
	Balanced	0.174	0.316	1.19	0.583
	Embraced	0.589	0.328	1.803	0.072
Peer Support	Normalized	-0.02	0.358	0.98	0.955
	Balanced	-0.364	0.351	0.695	0.299
	Embraced	0.454	0.42	1.574	0.28
School Support	Normalized	0.13	0.348	1.139	0.708
	Balanced	0.237	0.328	1.267	0.471
	Embraced	-0.506	0.352	0.603	0.151

OR = Odds ratio of the effect of a one standard deviation increase of the predictor

† These variables are represented by their strongest predictor group; all other response categories were non-significant

*p < .05, ** p < .01

No predictors had a significant parameter for the comparison of the "Liminal" group versus the "Normalized" group. A comparison of "Liminal" to "Embraced", however, found two significant effects: Relative to the "Academic Performance" variable, each standard deviation of increase in the predictor increased the likelihood of being in the "Embraced" group by a multiplicative of more than 3.30 Conversely, identifying as a "Male" predicted increased likelihood of membership in the "Liminal" group, as opposed to the "Embraced" group, by a multiplier of roughly 7.09.

Further, a significant effect was found in the contrasts between the "Liminal" and "Balanced" group in terms of the "Parent's Education" variable, whereby participant-reported parental membership in the "BS/BA" level of education increased the likelihood of being in the "Liminal" cluster by nearly five-fold.

Notably, in separate follow-up analysis wherein the "Normalized" group was assigned the referent status, a single strongly significant parameter estimate was reported for the "Academic Performance" variable in the case of "Balanced" versus "Embraced": ($\beta = 1.528$, 95% CI [2.108, 10.084], $p = 0.001^{**}$, OR = 4.611). Aside from this one additional finding, in no other case, utilizing this alternative referent or any other, were significant parameter estimates determined for the full model.

Following the full model analysis a reduced model containing only the two strongest predictors – Academic Performance and Peer Support – was refined utilizing a step-wise comparative variable decrement procedure. This was an effort to mitigate the shortcomings related to the analytic complexity of the full model, and, further, to isolate those predictive effects that carried the greatest weight in terms of influencing the likelihood of belonging in each transition group. This reduced model was determined to be statistically significant $\chi^2(6, N = 131) = 37.950$, Nagelkerke $R^2 = .269$, $p < .001$, with non-significant Pearson and deviance goodness-of-fit indices. No goodness-of-fit errors in the production of the reduced model were reported. The new model was, however, mildly diminished in its

predictive power, with the overall correct prediction rate calculated at 42.7%, with the weakest group prediction rate being for the "Liminal" cluster at 22.2%.

Here, the significant unique contributions to the reduced model were both the "Peer Support" and "Academic Performance" variables. In terms of both predictors, the reduced model demonstrated a much stronger effect than the full model for each variable. These are findings summarized on Table 20 (below).

Table 20

Predictors' unique contribution to the reduced multinomial logistic regression model (N=131)

Predictor	χ^2	*df*	*p*
Academic Performance	21.893	3	.000**
Peer Support	18.158	3	.000**

*p < .05, ** p < .01

Parameter estimates for the reduced model (Table 21, below) displayed a complex pattern of intergroup predictor effects. With regard to the "Academic Performance" variable, evidence supported that participants with the greatest association to strong academic performance were those in the "Embraced" cluster, the likelihood of which increased by a multiplier of more than two-fold over the "Liminal" group and three-fold over the "Normalized" group for each increase in standard deviation of the self-reported score. A contrast, too, found that "Academic Performance" was further differentiated between the "Balanced" and "Normalized" clusters, favoring the likelihood of being in the latter group by a multiplier of roughly 2.28 for each standard deviation of increase in self-reported academic performance.

Concerning the "Peer support" predictor, the findings suggested that the statistically significant effects favored participants being in the "Embraced" group, as the likelihood of being in the group increased relative to both the "Liminal" and "Balanced" groups by nearly two- and three-fold, respectively. Further, a significant effect was reported comparing the "Normalized" and "Balanced"

group, favoring the former by a multiplicative increase of about two-fold per standard deviation of increase in participant reported peer support levels.

Table 21

Reduced model parameter estimates contrasting the cluster groups (N=131)

Predictor	Liminal vs.	*B*	*SE*	*OR*	*p*
Academic Performance	Normalized	-0.449	0.278	0.638	0.106
	Balanced	0.375	0.26	1.454	0.149
	Embraced	0.862	0.29	2.368	0.003**
Peer Support	Normalized	0.178	0.266	1.195	0.502
	Balanced	-0.469	0.246	0.626	0.056
	Embraced	0.688	0.301	1.989	0.022*
	Normalized vs.				
Academic Performance	Liminal	0.449	0.278	1.567	0.106
	Balanced	0.824	0.302	2.279	0.006**
	Embraced	1.311	0.328	3.711	0.000**
Peer Support	Liminal	-0.178	0.266	0.837	0.502
	Balanced	-0.647	0.282	0.524	0.022*
	Embraced	0.51	0.334	1.665	0.127
	Balanced vs.				
Academic Performance	Liminal	-0.375	0.26	0.688	0.149
	Normalized	-0.824	0.302	0.439	0.006**
	Embraced	0.487	0.303	1.628	0.108
Peer Support	Liminal	0.469	0.246	1.598	0.056
	Normalized	0.647	0.282	1.91	0.022*
	Embraced	1.157	0.307	3.18	0.000**

OR = Odds ratio of the effect of a one standard deviation increase of the predictor
* $p < .05$, ** $p < .01$

Findings Related to Research Question #3

The third research question examined in this dissertation study was "To what extent do adolescent Geek identity transitions influence expressions of creative behavior?" Relying on the composite model of the development of creative identity, these data were analyzed in terms of the effect of the transition status determined earlier on various self-reported measures of creativity as captured by the CAAC.

To determine the effect of adolescent Geek identity transition on creative behavior at the broadest level, the first analysis conducted was a one-way MANOVA in all six area assessed by the CAAC, utilizing transition group membership as the independent variable. A number of statistically significant findings were reported, which, for ease of viewing, are detailed in Table 22 (below):

Table 22

Descriptive statistics and mean differences in CAAC scores by transition cluster (N=131)

Variable	Liminal		Normalized		Balanced		Embraced		*F*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Multivariate[a]									3.438**	.144
Writing	-0.43	0.99	0.15	0.85	-0.11	0.77	0.42	1.13	5.089**	.107
Music	-0.28	0.89	0.19	1.01	-0.09	1.02	0.23	1.04	2.069	.047
Art	-0.27	0.98	0.54	0.91	-0.12	0.82	0.03	1.12	3.576*	.078
Science/Math	-0.43	0.60	-0.08	0.97	-0.10	0.94	0.56	1.15	7.180**	.145
Technology	-0.24	0.90	-0.06	0.91	-0.09	1.07	0.36	1.02	2.482	.055
Everyday	-0.41	1.01	0.06	0.95	0.39	1.04	0.01	0.86	4.092**	.088

[a] Multivariate analysis used Wilk's multivariate criterion
*p < .05, ** p < .01

Post hoc analysis using Tukey's HSD demonstrated that mean differences in the writing domain were largely attributable to differences between the "Liminal" group (M=-.43 SD-.99) and the "Embraced" group (M=.42 SD=1.13) as these were found to be significant at p = .001. No other differences between groups were found in the writing domain. Mean differences in the art creativity domain were resultant from differences between the "Liminal" group (M=-.27 SD=.98) and the "Normalized" group (M=.54 SD=.91), where the mean for "Liminal" was statistically significantly lower at the p = .02 level. Here, again, no other mean differences in the everyday creativity domain were found. A similar pattern was found in the everyday creativity scores, finding that the mean differences were isolated to group differences between the "Liminal" group (M=-.41 SD=1.01) and the "Balanced" group (M=.39 SD=1.04), a finding which was significant at p = .004.

In contrast to the earlier findings, a more encompassing effect was found in the science/math domain, where the "Embraced" group (M=.56 SD=1.15) had significantly higher self-reported creative

behaviors than members in all three other groups ("Liminal" [M=-.43 SD=.60], "Normalized" [M=-.08 SD=.97], and "Balanced" [M=-.10 SD=.94],), the findings of which were significant at p = .001, p = .051 (a very close marginal finding), and p = .019, respectively.

Analysis of the *quality* of creative behaviors were then analyzed using a similar procedure. Again, a one-way MANOVA was conducted on to evaluate differences in quality among the six creativity areas measured on the CAAC. In this circumstance, too, statistical significance in the effect of cluster membership was found in the quality of self-reported creative behavior across creativity areas (see Table 23, below):

Table 23

Descriptive statistics and mean differences in CAAC quality scores by transition cluster (N=131)

Variable	Liminal		Normalized		Balanced		Embraced		*F*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Multivariate[a]									2.331**	.102
Writing	-0.18	0.85	0.17	1.01	-0.26	0.86	0.30	1.17	2.546	.057
Music	-0.20	1.01	0.11	0.90	-0.07	0.97	0.19	1.08	1.107	.025
Art	-0.19	1.00	0.39	1.02	-0.19	0.71	0.12	1.15	2.291	.051
Science/Math	-0.39	0.51	-0.01	0.98	-0.09	0.93	0.47	1.25	5.085**	.107
Technology	-0.20	0.55	-0.13	0.86	0.05	1.15	0.24	1.23	1.363	.031
Everyday	-0.43	0.95	0.10	0.92	0.38	1.11	0.00	0.87	4.217**	.091

[a] Multivariate analysis used Wilk's multivariate criterion
*p < .05, ** p < .01

A follow-up assessment, again Tukey's HSD, found significant mean differences at the p = .001 level in the quality of scientific and mathematic creative behavior between the "Liminal" group (M=-.39 SD=0.51) and the "Embraced" group (M=.47 SD=1.25), wherein the latter was the higher of the two means. Likewise, mean differences in the quality of everyday creativity were isolated to statistically significant differences between the "Balanced" group (M=.38 SD=1.11) and the "Liminal" group (M=-.43 SD=.95), the latter of which was the lower of the two. These findings were significant at the p = .003 level.

Finally, an analysis of the *quantity* of creative behaviors was conducted. As before, the starting place for this analysis was in carrying out via the examination of a one-way MANOVA wherein the quantity values of the six creative areas represented in the CAAC were set as dependent measures of the independent group cluster variable. As before, results of this analysis are presented in tabular form (Table 24, below).

Table 24

Descriptive statistics and mean differences in CAAC quantity scores by transition cluster (N=131)

Variable	Liminal		Normalized		Balanced		Embraced		*F*	η^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Multivariate[a]									3.015**	.128
Writing	-0.50	1.02	0.11	0.85	0.01	0.82	0.40	1.04	5.589**	.117
Music	-0.30	0.75	0.25	1.11	-0.10	1.03	0.22	1.06	2.361	.053
Art	-0.28	0.94	0.57	0.79	-0.04	1.01	-0.05	1.07	3.803*	.082
Science/Math	-0.40	0.77	-0.12	1.00	-0.09	0.89	0.54	1.09	6.411**	.132
Technology	-0.21	1.02	-0.01	0.91	-0.15	1.02	0.34	0.97	2.296	.051
Everyday	-0.26	1.06	-0.01	0.98	0.27	1.02	0.01	0.91	1.693	.038

[a] Multivariate analysis used Wilk's multivariate criterion
*p < .05, ** p < .01

Post hoc analyses of the Tukey HSD variety were conducted to learn more about the group differences in the quantity of creative behavior in the writing domain. Here, it was found that members of the "Liminal" group (M=-.50 SD=1.02) had significantly lower scores than those in the "Embraced" group (M=.40 SD=1.04), which was a finding statistically significant at the p = .001 level. Another follow-up test determined that the quantity of artistic creativity differed by group, with the "Liminal" group (M=-.28 SD=.94) having statistically lower scores than the "Normalized" group (M=.57 SD=.79), significant at the p = .025 level.

As before in the overall analysis, the pattern in the follow-up comparisons found that, for the quantity of science/math creative behaviors, "Embraced" participants (M=.54 SD=1.09) reported more activity than those in the "Liminal" group (M=-.40 SD=.77), the "Normalized" group (M=-.12 SD=1.00),

and the “Balanced” group (M=-.09 SD=.89). These findings were significant at the p = .001, p = .044, and p = .03 levels.

CHAPTER V

DISCUSSION OF THE FINDINGS

The purpose of this chapter was to interpret the findings detailed in Chapter IV. The present discussion will be divided into four sections: an *overview of the study*, a *summary of the findings*, *conclusions*, and, finally, *recommendations for future research*.

Overview of the Study

The purpose of this study was to investigate adolescent Geeks' identity transitions, predictive influences on the identity transition, and their potential to influence the creativity of young people. Three questions guided the study:

1. What is the nature of adolescent Geek identity transitions?
2. What are the personal and support predictors of adolescent Geek identity transitions?
3. To what extent do adolescent Geek identity transitions influence expressions of creative behavior?

To address these questions in a conceptually rich, data-driven manner, I enacted the amalgamation of a composite theoretical model founded in the complementary perspectives of identity theory (IT), social identity theory (SIT), and creative identity development. This entailed positioning prior ethnographic findings of adolescent Geek identity transitions into a framework whereby they were operationalized from the position of IT as being instantiations of situational identity development. The

exogenous social features inceptive of this type of identity development were described, according to SIT, as being a consequence of crowd identity transition occurring in adolescence.

This theory-oriented understanding of adolescent Geek identity transitions was then situated centrally in a modified model of creative identity development most directly similar to the one articulated by Petkus (1996). Thereby, the external predictive factors, including elements such as various personal characteristics which had formed the basis for discourse in the Geek culture, as well as the intrinsic contextual support characteristics which may affect adolescent responses to the stigma of the adolescent Geek identity, were hypothesized to foretell a tendency toward certain outcomes of adolescent Geek identity transition. Furthermore, variant adolescent Geek identity transitions themselves were hypothesized to influence the expression of creative behaviors, specifically, in terms of an effect on the domains of creativity, the quality of creative behaviors, and their quantity.

To approach the major constructs in this complex framework, a researcher-created survey instrument was developed and paired with an extant measure of affinity for creative activity and accomplishment, an updated version of the CAAC (Paek & Runco, 2017). This instrument parameterized the underlying dimensions of adolescent Geek identity transitions as being dependent on a combination of previous and current identification with the Geek crowd and previous and current affiliation with the Geek role identity. The digital survey instrument was administered to a total of 192 adolescent Geeks in a small number of venues, including online fan communities and middle schools. In total, 131 responses to the survey were retained, the mean respondent age of which was 14.6 years.

Making use of a process like that which was detailed in the family of identity development studies beginning with Luykcx et al. (2005), survey data were analyzed by first composing the indicators of crowd and role identity development into a series of holistic groupings – referred to as *identity transition statuses* – by means of cluster analysis. The role of these statuses was then determined by

their statistical relationship to predictors via the creation of a multinomial logistic regression model, and their relationship to creative behavior was assessed through a series of one-way MANOVAs.

Summary of the Findings

This section will provide an account of the salient findings of this study in a condensed form. These are organized, as they were previously (see *Findings*), according to the research question to which they corresponded.

Summary of findings for research question #1

With regard to the first question – *What is the nature of adolescent Geek identity transitions?* – the most significant findings can be summed up by describing the cluster analytic model that was produced and verified: Considering a number of potential variant outcomes, a cluster analysis supported, to the strongest degree among them, a model with four cluster groups.

These were (1) a group of 36 participants with a moderate difference among previous and current role identity, trending toward a neutral-positive Geek role identity, and a distinct pattern of extremely low levels of self-reported Geek crowd identity, relative to both the previous and current referents, (2) a group of 24 participants demonstrating moderate-negative levels of current Geek role and crowd identity and higher levels of previous Geek crowd and role identity, (3) a group of 34 participants with a consistently poor affinity for Geek role identity and a moderate, neutral-trending Geek crowd identity, and (4) a group of 27 participants with strong, positive, levels of self-reported association with Geek crowd and role identities with little variation over time.

These clusters were labeled as: (1) a *Liminal* Geek identity transition group, (2) a *Normalized* Geek identity transition group, (3) a *Balanced* Geek identity transition group, and (4) an *Embraced* Geek identity transition group.

Following the advice of Jain and Dubes (1988), the validity of the cluster model was assessed in terms of three types of evidence to support its validity: Evidence of the *internal validity* of the model was examined by means of a follow-up analysis of the four indicators of adolescent Geek identity transitions, wherein a one-way MANOVA was carried out to determine group mean difference based on the influence of participant sorting by the four-cluster solution. This analysis returned a strongly statistically significant result: F (12, 328.365) = 41.760, $p < .0005$; Wilk's $\Lambda = 0.086$, partial $\eta^2 = .558$, lending credence to the idea that the four clusters did significantly describe variations in the indicators.

Evidence for the *relative validity* of the four-cluster solution was investigated by evaluating comparative data: This was both a comparison of the current, adolescent cluster model to an alternative cluster model – one generated using other cluster-analytic methodologies – and a comparison of the adolescent cluster model to a moderately-sized adult sample (N = 62) of Geek identity data gathered as part of the pilot study. In the case of the former, evidence confirmed that a four-cluster solution following a two-step methodology held the basic form, if not the exact number, of relative patterns in the indicator variables. That is to say, all four clusters extracted by means of the k-means method were identifiable in the two-step cluster solution. In the case of the latter, clear evidence supported the four-cluster model relative to all other alternatives generated in the pilot, as it was the only unambiguous solution for the pilot data set (see *Pilot Study* for more).

Finally, evidence for the *external validity* was considered from the position of the extent to which the pattern of cluster data matched the characteristics of the four known adolescent Geek identity transition statuses present in the ethnographic literature. By and large, the present, four-cluster

solution did display characteristics that matched the time-referent trajectories exemplified in these studies. This was most obvious with regard to cluster groups (2) and (4), the *Normalized* and *Embraced* Geeks, which demonstrated a pattern of differences among indicators which nearly exactly described the transitions as they were given in Francis, Skelton, and Read (2012) and Bucholtz (1999). The situation was a little more complex with regard to clusters (1) and (3), which was perhaps illustrative of a cultural shift in how these adolescents chose to self-identify. This circumstance, articulating a divergence from prior ethnographic findings, is unpacked in the following section (see *Conclusions*, below).

Summary of findings for research question #2

Considering the extent to which personal and support influences may differentiate the likelihood of belonging in an identity transition group, deliberations regarding the weight of evidence by which to address the research second question – *What are the personal and support predictors of adolescent Geek identity transitions?* – employed a reduced multinomial logistic regression model describing the effect of two predictor variables on adolescent Geek identity transition statuses. Generally, the reduced model was preferred, demonstrating statistical significance in its formulation ($\chi^2[6, N = 131] = 37.950$, Nagelkerke $R^2 = .269$, $p < .001$) and fair predictive power, with an overall correct prediction rate of 42.7%.

Summary data for this analysis are organized below according to significant interactions for each predictor variable:

Academic Performance – The effect of this predictor was best described as a condition wherein the likelihood of belonging in the Embraced group was most strongly associated with a tendency to self-report higher overall grades. Significant differences were found in log-linear comparisons to both the

Liminal group (β = -.862, 95% CI [.239, .745], p = .003, OR = .422) and the Normalized group (β = -1.311, 95% CI [.142, .512], p < .000, OR = .269), indicating that, roughly, each standard deviation of increase in the variable increased the likelihood of being in the Embraced group, with reference to the former by a multiplier of 2.4x, and, in the case of the latter, by 3.7x. From the inverse perspective, it was the Normalized group that was most strongly associated with lower self-reported academic performance, the findings of which were significant in comparisons to both the Balanced group (β = .824, 95% CI [1.262, 4.116], p = .006, OR = 2.279) and the Embraced group (β = 1.311, 95% CI [1.953, 7.052], p < .000, OR = 3.711, inverse of above), highlighting a general trend of negative affiliation with academic performance for participants in the Normalized cluster.

Peer Support – This variable predicted similar differences among the four transition clusters. Participants in the Embraced group were again associated with the highest self-reported levels of the predictor, with the model finding statistically significant differences favoring the likelihood of being in the group in comparisons to both the Liminal group (β = -.688, 95% CI [.279, .907], p = 0.022, OR = .503) and the Balanced group (β = -1.157, 95% CI [.172, .574], p < .000, OR = .314). Conversely, lower levels of self-reported peer support predicted membership in the Balanced group, with statistically significant findings referent to the Normalized group (β = .647, 95% CI [1.100, 3.318], p = 0.022, OR = 1.910) and the Embraced group (β = 1.157, 95% CI [1.743, 5.802], p < .000, OR = 3.180), and a close case in comparison with the Liminal group (β = .469, 95% CI [.988, 2.587], p = 0.056, OR = 1.598).

Summary of findings for research question #3

These analyses intended address the third research question – *To what extent do adolescent Geek identity transitions influence expressions of creative behavior?* – by exploring the influence of adolescent Geek identity transition statuses on the quantity and quality of the creative behaviors of

young Geeks. Both summary, domain-general findings and individual, domain-specific findings were investigated by means of one-way MANOVA analyses wherein identity transition statuses served as an independent variable.

Significant results were found in four areas: Written Creativity, Artistic Creativity, Science/Math Creativity, and Everyday Creativity. These varied in terms of quantity and quality, with some findings supporting a quality-centric influence on the area (as was the case with Everyday Creativity), others hinting at a quantity-centric effect (as with Writing and Art Creativity), and still others being generalized (as with Science/Math Creativity). These broad findings, as well as the more detailed group comparison data, are summarized below:

Written Creativity – Creative domain analysis was conducted on participants' self-reported CAAC scores, finding a significant influence of adolescent Geek identity transition on the creativity measure: $F(3,127) = 5.089$, $p < .01$, partial $\eta^2 = .107$. Post hoc analysis localized mean difference between the Embraced group (M=.42 SD=1.13) and the Liminal group (M=-.43 SD-.99), significant at p = .001. Further examination revealed that the effect of identity transition group on the writing domain was largely attributable to the quantity of written works, as there was no significant effect for in the follow-up quality analysis. For the quantity of written creative behaviors, there was a significant effect found: $F(3,127) = 5.589$, $p < .01$, partial $\eta^2 = .117$. Post hoc analysis again isolated this effect to a mean difference between the Embraced group (M=.40 SD=1.04) and the Liminal group (M=-.50 SD=1.02), which was significant at p = .001.

Artistic Creativity – There was a significant effect for the art domain in general found during analysis via a one-way MANOVA on the six domains of creativity assessed in the CAAC: $F(3,127) = 3.576$, $p < .05$, partial $\eta^2 = .078$. Post hoc analysis demonstrated that mean differences in this domain were based on differences between the Liminal group (M=-.27 SD=.98) and the Normalized group (M=.54

SD=.91), with the Liminal group demonstrating lower levels of artistic creativity, the findings of which were significant at p = .02. Similar findings were also reported for the *quantity of artistic creative behaviors*: $F(3,127) = 3.803$, $p < .05$, partial $\eta^2 = .082$. In this case, too, post hoc assessment found mean differences at the p = .025 level in the quantity of artistic creative behavior between the Liminal group (M=-.28 SD=.94) and the Normalized group (M=.57 SD=.79). No significant differences in the quality of creative behaviors were found which suggested that, as with the writing domain, differences in artistic creativity were reliant on variations in the quantity of creative behavior among identity clusters.

Science/Math Creativity – Significant results for this domain were, in a manner unlike others, discovered among multiple groups. In the omnibus creative behavior analysis, there was a significant effect for the domain: $F(3,127) = 7.180$, $p < .01$, partial $\eta^2 = .145$. Post hoc analysis found that, in this case, the mean for the Embraced group (M=.56 SD=1.15) was significantly higher than that of all three other identity transition clusters. With respect to the quality of science/math creativity, the effect was more moderate: $F(3,127) = 5.085$, $p < .01$, partial $\eta^2 = .107$. Here, post hoc found a difference determined only for the polarized Embraced group (M=.47 SD=1.25) and the Liminal group (M=-.39 SD=0.51). However, in the analysis of the quantity of science/math creativity, the significant effect ($F[3,127] = 6.411$, $p < .01$, partial $\eta^2 = .132$) again displayed the pattern of the broader analysis, with the Embraced group (M=.54 SD=1.09) again demonstrating significantly more quantity in this domain than all three others.

Everyday Creativity – General analysis reported a significant effect for the self-reported everyday creativity of participants for a one-way MANOVA test: $F(3,127) = 4.092$, $p < .021$, partial $\eta^2 = .088$. Here, mean differences were resultant from differences between the Balanced group (M=.39 SD=1.04) and the Liminal group (M=-.41 SD=1.01), where the mean for Liminal was statistically significantly lower at p = .004. Likewise, statistically significant results were found in an investigation of the *quality of everyday creativity*, $F(3,127) = 4.217$, $p < .01$, partial $\eta^2 = .091$, whereby post hoc test

analysis – significant at p = .003 – revealed difference between the Balanced group (M=.38 SD=1.11) and the Liminal group (M=-.43 SD=.95), the latter of which was again the lower of the two.

Conclusions

Resulting from the accumulation of empirical evidence and guided by the composite theoretical framework that was at the core of the study, three conclusions were drawn regarding adolescent Geek identity transitions and their role in shaping the creative behaviors of young people:

1. Adolescent Geek identity transitions represented variant developmental trajectories predicated on differential responses to situational identity development. Furthermore, each status bore a signature pattern of responses across the whole of the composite model.
2. Among the proposed personal and support predictors, the two most strongly associated with differences in adolescent Geek identity transition statuses were academic performance and peer support. Increases in both predictors comparatively favored being in the Embraced identity transition group.
3. Among creative behaviors, the four areas most strongly influenced by adolescent Geek identity transitions were written, artistic, science/math, and everyday creativity. Higher self-reported creativity in each area, was, most notably, uniquely associated with a single identity transition group.

A careful consideration of the research context and implications of these conclusions will form the background for the discussion which makes up the following section with each question being attended individually:

Conclusion 1: Adolescent Geek identity transitions represented variant developmental trajectories predicated on differential responses to situational identity development. Furthermore, each status bore a signature pattern of responses across the whole of the composite model.

Perhaps the most complex of the many efforts that made up this dissertation study was the act of weaving together multiple strands of research into a single theoretical network which could bind a phenomenon that had yet to be fully described. This started simply enough, however, as an earnest attempt to conceptualize some rationale for the conflicting accounts in the ethnographical data which suggested, time and again, that adolescence was a key moment in the development of the Geek identity, but which failed to agree on major details of its predictors, its processes, or its outcomes.

The most uneasy merger of theoretical perspectives with respect to identity development was in defining the adolescent Geek identity transition as a type of situational identity change (as postulated in Burke & Stets, 2009) while, at the same time, arguing that it was also a consequence of multiple developmental pathways (as in Crockett & Crouter, 1995). To be clear, a strict reading of identity theory holds no place for a notional field of alternative possible selves that are to be refined by experience and personal choice. Rather, there are actual, lived identities which are realized and reinforced through homeostatic perceptual and cognitive responses (Stets & Serpe, 2013).

Furthermore, there is typically no place for identity in research utilizing the adolescent developmental pathway perspective, for, although these studies may discuss self-concept as one of many important features of the population, these works concern themselves largely with determining trajectories according to their most salient outcomes (cf., Kuzucu, Bontempo, Hofer, Stallings, Piccinin, 2014; Turner, Shattuck, Finkelhor, & Hamby, 2017) and subsequently do not, in contrast to the study of adolescent identities, tend to burden themselves overmuch with deep meditations on the personal significance of contextual identity formation.

Resolving this apparent paradox would require evidence to support an interpretation of situational identity development as the product of an influential event in the lives of certain individuals which, by virtue of variations in the initial conditions of the exogenous situation, could concurrently display differences in their affinity for an identity and identity-referencing behavior. That, in other words, there is a consistent adaptive reaction to a changed context whereby relatively rapid modification of the individual's identity standard (as in Stets & Burke, 2003) can produce an overall variation in the type of expressed behavior dependent on the extent to which an identity is advanced. As such, at least with regard to creative behaviors, hierarchies of identity salience (as in Carter, 2013) might be thought to promote emergent states whereby different behaviors, and not just different levels of behavior, are promoted.

Although this position was, in principle, supported by the identity transition data collected in this study – there was, in all cases, a distinct pattern in the co-development of crowd and role identity such that different levels in the "starting positions" for previous identity did pair with different "current positions" of in participants' identities – much stronger evidence for this interpretation was in the summary findings for the creative identity development model as a whole, which demonstrated not only an exclusive pattern of predictive influences for each of the statuses, but also a different "signature" of behavioral corollaries, that of identity-referent creative behavior, for each identity transition status.

Consider, as evidence in support of this argument, the abridged model finding statements presented on Table 25 (below), and, most especially among these data-referencing descriptions, the degree to which each identity transition state entailed a separable outcome, not only from the position of conclusions drawn about internal designations of the indicators of crowd and role identity development, but also concerning those inferences gathered from tracing a narrative of identity development from predictors to creative behaviors:

Table 25

Comparative summary of composite creative identity development model findings for adolescent Geek identity transition indicators, predictors, and creative outcomes

Identity Status	Indicator Levels	Predictor Comparisons (Comparator)	Quality of Creative Behaviors (Comparator)	Quantity of Creative Behaviors (Comparator)
Liminal	CC: Very Low CR: Average PC: Moderate to Very Low PR: Average	Negative academic performance (Embraced); Negative peer support (Embraced)	Lower science/math (Embraced); Lower everyday (Balanced)	Lower writing (Embraced); Lower art (Normalized); Lower science/math (Embraced)
Normalized	CC: Average CR: Moderately Low PC: Moderately High PR: Moderately High	Negative academic performance (Embraced & Balanced); Positive peer support (Balanced)	*No differences*	Higher art (Liminal); Lower science/math (Embraced)
Balanced	CC: Average CR: Moderate to Very Low PC: Average PR: Very Low	Positive academic performance (Normalized); Negative peer support (Embraced & Normalized)	Higher everyday (Liminal)	Lower science/math (Embraced)
Embraced	CC: Very High CR: Very High PC: Moderate to Very High PR: Moderately High	Positive academic performance (Liminal & Normalized); Positive peer support (Liminal & Balanced)	Higher science/math (Liminal)	Higher science/math (All others); Higher writing (Liminal)

CC – Current Crowd; CR – Current Role; PC – Previous Crowd; PR – Previous Role

Vexingly, however, certain of these selfsame model inferences also complicated the fairly straight-forward conceptualization of identity transition statuses as they had been understood in prior works. As has been mentioned previously, the labeling of the Liminal group was a phenomenon that grew out of this study, but which was undergirded by implicit conceptualizations of the adolescent Geek identity as represented in the literature. That is to say, even though the Liminal group label was only implicitly referenced, being nominated as “Non-Geek” early in the literature review phase of this

dissertation (see *Review of the Literature* for more), the status described an enduring tendency to have low interaction with the Geek crowd identity and some moderate tendency, over time, toward an average Geek role identity. This pattern of identity responses almost certainly reflected the conditions of a marginal Geek social identity (as in Kendall, 1999 and Jackson, 2014) and potentially highlighted a circumstance wherein the individual had been labeled a Geek, but had not yet chosen to associate with others based on their Geek interests. (See Eklund & Roman, 2017 for a similar case).

Furthermore, along with the Balanced Geek identity transition group, the Liminal group was one which took on an additional layer of nuance in its present depiction. To some extent, both groups differed from their prior ethnographic descriptions. For, rather than being easily extracted, as previously expected, by wholly negative adolescent orientations to aspects of the Geek identity, the pattern of responses provided by participants in these groups instead suggested that although there were sectors of Geek participants who definitely did not self-associate with the Geek crowd or Geek role, both still maintained some neutral affinity.

Though the reason for these discrepancies cannot be known for certain without further study, it seems likely that this effect is at least partially one of changing cultural views penetrating into adolescent peer culture – this is discussed at some length in Mendick and Francis's (2012) and in Cross's (2005) writings – such that even those individuals who may have marginal tendencies toward the Geek identity, as both Liminal and Balanced Geeks are thought to, may not express self-censure of the identity to as large a degree as that which had been reported in previous generations.

Conclusion 2: Among the proposed personal and support predictors, the two most strongly associated with differences in adolescent Geek identity transition statuses were academic performance and peer

support. Increases in both predictors comparatively favored being in the Embraced identity transition group.

Of the nine proposed predictors in the original theoretical model, only two predictors survived, these having been retained by virtue of their unambiguous statistical relevance. And yet, even with such a small number of predictors isolated, there are several noteworthy corollaries to the findings that are deserving of further elaboration.

To begin with, the predictive model found a strong effect for the influence of *academic performance*, which, in the strongest case, improved the odds for being comparatively associated with the Embraced group by nearly four-fold per increase in standard deviation of the self-report measure. Indeed, in an overall sense, the most compelling predictions for group belongingness based on academic performance favored the Embraced group consistently when compared to other statuses.

In a slightly embarrassing way, it appears to be likely that these findings speak to the pervasive power of the 'geek' or 'nerd' stereotype, either as an effect of cultural ideology influencing adolescents (as discussed in Anderegg, 2007) or as a touchstone for group identification due to the stereotype bearing a seed of veracity. Because members of the Embraced group in particular were identified by their strong associations with both the Geek crowd and role identities, it may fairly be inferred that a group of high-performing adolescents with these traits may have come to judge themselves to be members of the Geek culture based, at least in part, on this sort of stereotyping.

This is a phenomenon that, in certain cultures, seems deeply and inextricably bound with the Geek stereotype. In Germany, for instance, the slang term for Geek, 'Streber', literally refers to a student who "strives for [academic] success" (Rentzsch, Schroeder-Abe, & Schutz, 2013, p. 411). This is similar to associations made by students in British schools, where their adolescent terms for Geek, 'boffin' or 'keeno', have often denoted academic diligence (Jackson, 2014). As such, to even mention

being a Geek in those cultures is to speak of high academic achievement, or, in the very least, to the intent of individuals focusing on such accomplishments. Although intentionally extreme, these examples serve to problematize the understated conceptual relationship between strong self-reported academic performances and "the Geek" as a notion, which would have obviously been felt most greatly among students immersed in the standard American cultural milieu.

Oddly, even though it may be assumed that the group most effectively influenced by poorer academic performance would be the marginally Geeky Liminal group, it was instead the Normalized group which had the greatest number of counter-associations with the academic performance predictor. As this was the group associated with a prior history of being a Geek and a current identification inclined toward the average, it is possible to draw the conclusion that the influence of this predictor might being pointing to a narrative whereby members of the group may have undertaken, in the service of efforts to distance themselves from the Geek identity, to consciously underperform academically.

Not only is such an interpretation enforced by ethnographic evidence (see Merten, 1996 for examples), but it also reflects an enduring concern in the study of adolescent Geeks. In her (2014) study, Chau spoke to this issue, which she observed to have qualities of both a *stereotype threat* and a *stigma*, with respect to Geeky young women. She argued:

> Because stereotype threat focuses on a negative stereotype about one's *own* group, the fear of being labeled a nerd does not directly align with stereotype threat research. Instead, in general, the fear of being labeled a nerd more closely fits with the concept of stigma. Crocker, Major, and Steele (1998) argued that "in essence, stigma is a devaluing social identity" (p. 505). In other words, the category of nerd can be a social identity, and because the label nerd is feared, it

> appears to be devalued. Here I propose that to avoid being stigmatized as a nerd, women may be underperforming (2014, p. 14).

Of course, in terms of the present study, it would be uncertain if, as Chau (2014) maintained, that these effects are stronger in young women than in young men, especially because the gender predictor was not retained in the reduced predictive model in this present study; however, the basis of her arguments should not be constrained to Geeks of a single gender, or culture (see Steele, 1997 for discussion), but should, in fact, characterize an omnipresent challenge for young geeks of all types.

The contribution to the discussion of Geek stereotype threat and the nature of the Geek stigma made by this study was that there were findings to support variances in the developmental pathways associated with the adolescent Geek identity which could differentiate how a young person might respond: Presumably, if the Geek stereotype were the crux of the dilemma, a choice to persevere through the threat and continue to seek high achievement would predict that the adolescent would embrace the Geek identity, whereas capitulating would predict a tendency to normalize. Without overextending the interpretability of these limited findings, it should suffice to mention that the situation, as a whole, bears some resemblance to issues surrounding the development of "grit" (as in Duckworth, Peterson, Matthews, & Kelly, 2007) and that further investigation along these lines is warranted.

There is, interestingly enough, another predictive finding which may help to further explore these issues of stereotype threat, stigma, and the extent to which they could contribute to embracing the Geek identity: In the predictive model for this study, the second retained variable, *peer support*, favored, in a manner very much like the earlier academic achievement variable, the inference that increases in the predictor improved the overall odds of being in the Embraced group to a similar magnitude.

As such, belongingness in the Embraced transition status was predicted not only by higher self-reported academic achievement, but also higher self-reported peer support. Could it be the case that adolescents in the Embraced group were free to express this identity because they were lucky enough to weather the penury of their non-Geek peers by drawing on the support of their Geeky peers? This narrative, if it were the case, would agree with Bucholtz's (1999) characterization of young Geek social groups who have embraced the Geek identity, and, further, it might, from a theoretical perspective, typify the reciprocal, synergistic interactions between personal characteristics and peer supports postulated in works like that of Newcomb (1990). Alas, though, the potential for such kinds of personal and support interactions can only be speculated about with the evidence from this current model.

Even on its own, however, the influence of peer support on adolescent Geek identity transition should not be overlooked in terms of its positive predictive power in favor of the Embraced Geek identity. In context, it cannot be stressed enough how often in the literature of adolescent Geek studies the proposition has been given that poor peer support for the Geek identity creates the conditions for distancing oneself from the stigmatized identity. (For a brief overview, see the appropriate section in the *Review of the Literature*). Evidence to support the notion that the opposite effect is possible – that increased peer support can create the conditions for approaching the Geek identity – has been, until now, tellingly sparse.

Advocacy for Geeks and the Geek culture has often focused on the vital importance of social acceptance as a precondition for realizing the potential of these individuals. Speaking to this issue in light of modern attempts to portray Geeks in a more positive, humane manner, Stanley (2015) wrote:

> Literature and media portrayals of geeks and nerds can send one of two messages to readers and viewers: that people who take part in the geek culture are valuable members of society, or that they are not. If portrayals do present geeks and nerds as interesting, well-rounded

> characters, they work to debunk stereotypes and have the power to help change cultural perceptions of these people in positive ways. They can help those who identify as geeks and nerds, or who have ever been labeled, feel valued by society, because they have been portrayed with dignity and respect. (Stanley, 2015, p. 92).

Taken further, the logical thrust of Anderegg's (2011) book – which was a wonderful example of advocacy writing on behalf of adolescent Geeks – followed from the basic premise that anti-intellectual elements in the American culture have contributed to a continued suppression of those advancements – such as contributions to STEM areas – which are most strongly associated with the stigmatized Geek identity, and that, given enough support, a culture which accepted Geeks might realize significant benefits.

Findings, such as those in the present study, which demonstrate the positive relationship between peer support and adolescents belonging in the Geekiest, Embraced, identity group can help to lend empirical support to these advocate arguments, both by increasing the validity of their claims and by adding a context for further discussion. More so, looking ahead a bit, these findings contribute to an overall position that having the freedom to approach the Geek identity can create positive consequences for the creativity of adolescent Geeks. That, indeed, if given support, adolescent Geeks can develop valuable, creative interests and skills which can, directly and indirectly, contribute to society as a whole.

Conclusion 3: Among creative behaviors, the four areas most strongly influenced by adolescent Geek identity transitions were written, artistic, science/math, and everyday creativity. Higher self-reported creativity in each area, was, most notably, uniquely associated with a single identity transition group.

Recognizing that adolescent Geek identity transitions could influence the expression of creative behavior was, from the very beginning, an important insight which impelled this dissertation study. However, until the data were analyzed, it was never certain exactly how the associations among identity transition statuses would play out among the areas of creative behavior reported in the CAAC. In other words, although there was a strong feeling – informed by a deep study of creative development and an understanding of adolescent Geek identity – that Geek identity transitions would affect creativity, no definitive positions had ever previously been taken about the various domains, qualities, or quantities by which the influence might be recognized with respect to any of the known adolescent Geek identity transitions.

For this reason, organizing the evidence of the manner in which adolescent Geek identity transitions shaped the expression of creative behavior was a process that might be best thought of, beyond a certain point, as refined conjecture. In some cases, such as with the findings suggesting that participants in the Embraced Geek group were, far and away, the most creative in terms of their scientific and mathematical behavior, there was much greater certainty owing to the existence of a larger framework within which such findings might be easily oriented. In other cases, such as the finding that Balanced Geeks demonstrated a significantly higher quality of everyday creativity, more study will likely be required to provide anything but the barest sketch of a rationale to describe the influence.

This effort to frame the significance of the variations in creative behaviors due to identity transition group differences began with a consideration of the comparative influence of adolescent Geek identity transitions on the quantity of creative activities within specific domains. First among these was an evaluation of the findings which suggested that participants in the Embraced group demonstrated higher-quantities of self-reported creative behavior with respect to their *written creativity*.

Here, the effect – exemplifying as it did the sum efforts of participants with regard to this sort of creative activity – was likely attributable to the literary nature of avocations held by highly Geeky adolescents. From fandom writing (as in Tosenberger, 2008) to world-building (as in Wolf, 2014), and even pen-and-paper roleplaying gaming (as in King, Borlund, & Stewart, 2003), a common thread running throughout the many venues of participation in the modern Geek culture is that they offer a wide range of opportunities by which to engage in co-creating narratives, exploring tropes, and re-interpreting fiction. In light of this abundance of opportunity, it should come as no surprise that Embraced Geeks would display a strong affinity for such activities.

A similar justification can be postulated for the influence of adolescent Geek identity transitions on the *artistic creativity* of participants. As before, given that certain Geek culture activities – fan art (Hackett, 2014), fandom handcrafts (Danahay, 2016), and cosplay (Flatt, 2015) being good examples – promote engagement with the arts, it is a reasonable conclusion to draw that the quantity of creative activities might be related to the availability of outlets. An interesting wrinkle here is that, on the surface, nothing about the group which had the strongest association with artistic creative behaviors, the Normalized Geek group, definitively implied a fondness for artistic creativity in particular.

Why could it have not have been musical creativity instead that Normalized Geeks preferred? Or technological creativity? One possible explanation may possibly be found in the way in which art-making appeals to adolescents whose identities have already experienced meaningful divergence, and in the unique way that it appeals to those individuals who are more consequently attracted to social interaction outside the Geek culture. Unlike Embraced Geeks, Normalized adolescents were not shown to have adhered to their Geek role or crowd identities as they progressed into adolescence.

A corollary of this transition may be that Normalized Geeks might maintain a continued openness to the prospect of identity exploration and, furthermore, may have cultivated a talent for

upholding a dual connection to the fantasy realms of the Geek culture and the social realities of the more popular adolescent peer culture. This interpretation closely aligns with the conclusions presented in Manifold's brilliant (2009) study, which advanced the notion that adolescent fan art-making most often comprises processes of developing a resonance with topics of art projects, self-exploration, community validation, and seeking homeostasis between fantasy-orientation and lived, real-world experiences.

The psychosocial argument for creative affinity has noteworthy consequences when extended to the domain of *scientific and mathematical creativity*, as the evidence from the present study supported the finding that Embraced Geeks expressed, to a stronger degree than any other transition status group, an aptitude for this type of creative behavior, both in terms of the quantity, and, to a smaller extent, the quality of their engagement. As Embraced Geeks were the group that represented the most staunchly and persistently Geeky of participants, an unavoidable conclusion related to these findings was that they, at least partially, validated the characterization of Geeks as being a social identity inherently related to an attraction to STEM activities (see Anderegg, 2011; Liggett, 2014; Stanton, 2014 for more).

In this way, the data supported the inference that individuals who were most able to surmount the negative pressures of the Geek stereotype threat (as in Steele, 1997; Cheryan, Plaut, Davies, Steele, 2009; Chau, 2014) were also those who had the greatest license to display high quantities of science/math creative behavior. However, these individuals, being additionally identified for the quality of their science/math creative behavior in comparison to participants in the Liminal group, seemed to also be more readily recognized for their creative efforts. This latter finding might further be evidence of a synergistic effect relative to the types of creativity being noticed by others in the context where the role identity and crowd identity converge, acting to intensify the reflected appraisals evident to the individual, and thereby confirming the Geek role identity (see Burke & Stets, 2009 for discussion).

With regard to *everyday creativity*, the findings were slightly more speculative than they were in previous areas. Working from the idea that some intrinsic characteristic of this type of creative behavior may have attracted a certain group of Geeks, which was the Balanced group, a brief review of the construct yielded a plausible interpretation in the comparative studies of Ivcevic (2007) who, broadly contrasting artistic creativity with everyday creativity across three studies, came, by the end, to describe everyday creativity as being "correlated with personality traits of extraversion and conscientiousness, as well as the experience of personal growth" (2007, p. 286). Ivcevic further qualified the differences between artistic and everyday creatives as being defined in terms of their "relationships to psychological health" whereby everyday creativity was generally associated with good mental health and "the need or desire to enrich one's daily experience and solve problems of daily living" (2007, p. 287).

As such, the moderately Geeky Balanced group's ability to be noticed for their acts of everyday creativity makes a certain sort of sense in context. These are adolescents who did not personally consider themselves to have the Geek role identity, but also who did not show an overt aversion to the crowd identity, even to the point of slightly approaching the identity over time. Being socially average, accepting, and expressing high-quality everyday creativity may imply, by this reading, signs of mental health resulting from a personally enriching adolescent Geek identity transition. However, even though such a narrative is pleasant, more research would definitely be necessary to confirm these tentative conclusions.

Finally, it is worth mentioning that, insofar as these findings have found agreement in the literature, they have tended to do so by highlighting that engaging with the Geek culture and approaching the Geek identity can serve as a facilitative environment and provide a positive psychosocial influence through symbolic interactions taking place between domains of creativity and the identities of participants in various transition groups. *Notably, this influence is still apparent in the converse*. In other words, there is an equal amount of evidence in these findings to support that

marginalizing a Geek identity can inhibit creative behavior. This was found strongly in all of the CAAC results which applied to the Liminal Geek group. Of the four identity transition groups, it was the marginally Geeky Liminals who, most likely resulting from the negative consequences of these identity-referencing processes, self-reported creative behaviors which were remarkably poorer than those of any other of the Geek statuses, being very low in nearly every domain, both for the quality and the quantity of creative expression.

Given these conditions, it could be inferred that the reaction of members of this group to situational identity development might have been one of avoiding the symbolic associations – and therefore creative behaviors – of the Geek identity while being unable to wholly escape it. There is cause to believe that such situations of adolescents suffering for long periods in an unwanted Geek identity do occur (see Hensley, 2011 for an example), and that these situations have detrimental effects on the personal experiences, social environments, and ideologies of these individuals (Lockhart, 2015). These may well be conditions which inhibit creative behaviors (see Davis, 1999 for a discussion), but they also point to greater concerns about the psychological well-being of these adolescents and the continued importance of seeking means by which to ameliorate the stigma of the Geek identity such that these unhappy circumstances are minimized, if not wholly rectified.

Limitations of the Study

It was with admirable candor that Milner (2004) placed a "warning label" on his book. In it, he made the pellucid case that no theory of adolescent development could ever fully describe the lived experience of young people; or, in his words:

> Theories, like most tools, are useful, but potentially dangerous. All theories focus on some features of the concrete world and ignore others; they enable you to see important processes

> that are obscured if you try to look at everything. This selectivity is their virtue and their limitation. […] To describe and explain the status processes that shape teenage behavior is not to capture the totality of teenage experience. Describing and explaining status processes is, however, a crucial prerequisite for understanding teenage behavior, and the significance of this behavior in wider society. (Milner, 2004, p. 10).

And though, to be fully transparent, his use of the word 'status' did not necessarily match the operationalized term often utilized in this study, the import of his statement is plain: Theories provide a fragile and incomplete view of the world. In this dissertation, especially, a lot of theories and theoretical perspectives were employed. At no level did a chapter or a section of the study develop without some reference to a theoretical foundation. As such, there is reason to credit that this dissertation suffered from certain unavoidable limitations.

One such limitation emerged early in crafting an understanding of the Geek culture. Drawing from the work of McCain, Gentile, and Campbell (2015), there was a moment when the study was explicitly divorced from a comprehensive description of Geeks when the decision was made to exclude the possibility that adolescents might be suffering from symptoms of mental illness concomitant with the conditions of a Geek identity transition. Indeed, data collected from McCain, Gentile, and Campbell's (2015) own study demonstrated that there was a subgroup of Geeks who displayed higher than average rates of depression and narcissism.

This opened the question of whether or not elements within the Geek community – and, perhaps more specifically, within the Geek ethos – might be perpetuating conditions that may have a negative influence on the developmental trajectories of Geeks as young adults. And there have been a number of studies which have advanced the possibility that such a relationship may, in fact, exist. Ging (2017), for example, drew an overt connection between the hegemonic masculinity apparent in the

Geek culture and the rise of vicious anti-feminist groups of the type who call themselves 'involuntary celibates' or 'incels'. A similar connection might be seen in the work of Kellaher (2015) who, in her study of the sexual behaviors of adults with autism spectrum disorder (ASD), found evidence to support the idea that individuals with autism might be attracted to online Geek communities like those of the 'furry' fandom as outlets for paraphilic sexual stimulation.

Here, it might be noted that, in all these cases, it was the Geek community itself that was attractive to individuals with extreme personalities and disordered cognitions. The only means of mitigating the potential influence of abnormal psychological development in adolescent Geeks in the present study was to focus on those parts of the Geek ethos that might be enriching and positive forces in the lives of young people, and which, for that reason, were least likely to contribute to negative developments in adulthood. This position is, however, more than a stance of wishful thinking: There is a small but growing pool of evidence suggesting that certain Geeky activities, like fantasy roleplaying gaming, may counteract negative symptoms of mental illness (cf., Allison, Wahlde, Shockley, & Gabbard, 2006; Granic, Lobel, & Engels, 2014), and, it is hoped, may in the future prove to have an ablative effect on the psyches of adolescent Geeks.

Another limitation of this dissertation study was a product of the decision to model the developmental pathways of adolescent Geek identity transitions without attending to the incremental development of Geek identity. This has created a situation wherein, fundamentally, identity changes within the transition were measured indirectly with respect to their overall effect and not with fine granularity; hence, a generally less parsimonious approach. These challenges were similar to those faced in the early study of identity within the identity status theory (IST) paradigm, wherein mutually exclusive statuses had been described and a complex scholarly debate arose concerning the degree to which these identity status would realistically reflect the experience of adolescent identity development (see

Kroger, Martinussen, & Marcia, 2010; Meeus, van de Schoot, Keijsers, Schwartz, & Branje, 2010 for discussion).

Ameliorating the concerns of this holistic approach to identity development was not feasible in the span of a single study. Rather, it was my view that the most accurate depiction of adolescent Geek identity transitions – mapping to the highest degree of fidelity the sum of extant ethnographic findings – was to be afforded the greatest priority, and that situating identity development in terms of its possible influence on creative behavior would best be accomplished by means of appropriately developing a quantitative analysis which would reproduce the ethnographic findings that inspired the study. Future studies, however, might be formulated to address these theoretical concerns and to continue the development of a model of adolescent creative identity development following from this initial investigation, despite its inherent flaws.

Finally, no account of the limitations of a study would be complete without giving attention to the issue of systematic error, or bias, embedded in the study. Concerns about two types of bias were most prevalent in this dissertation: The possibility of both (a) retrospective bias and (b) self-selection bias. In the case of the former, I went to great lengths to prevent a retrospective bias from affecting the variables of interest. This included generating a predictor variable that would capture the effect of the bias, collecting data which would limit the extent of the bias, and sampling a participant population wherein retrospective bias would be least formidable. These efforts took into account available suggestions for minimizing the effect of errors in participant retrospection from both the educational field (as in Lam & Bengo, 2003) and in developmental psychology (as in Hardt & Rutter, 2004). This was most especially informative of the requisite condition of the study that participants would be assessed in roughly the same developmental period and in the same context.

In the case of the latter bias, there was no avoiding the fact that participants would self-select based on the content of the study. Efforts to attenuate the effect of this type of bias were carried out in both offering the study to all individuals in each of the four participant communities and in collecting data from a number of separate sources, such that the effect of a particular culture was not overly saturated. Aside from these measures, the most reasonable position to take would be that the study was inexorably limited in this way, and that it is recognized that, as a result, the generalizability of findings may be adversely affected.

Implications for Practice and Policy

Throughout the process of developing, refining, and implementing this dissertation study, there was a fascinating disconnect in the educational and avocational nature of the adolescent Geek identity of which I had been dimly aware, and which grew in importance as I was drawing inferences about the model of creative identity development. This insight might be simply stated as follows: Although the Geek identity is ineluctably rooted in the American public educational system, it is in those very structures where it is least honored. Indeed, as the majority of Geek-centric writing has demonstrated, it is in proscribed safe spaces outside of schools – such as in comic book stores (Woo, 2012), the homes of older Geeks (King, Borlund, & Stewart, 2003), and convention halls (Kahler, 2015) – that young Geeks feel the freedom to engage with their avocations.

Here the findings of the present study have direct implications: As the Geek identity appears to be, at its heart, a natural corollary of the contextual psychosocial realities of the educational system and transitions in that identity during adolescence will occur in that venue, it stands to reason that Geek advocacy should be advanced therein. This has implications, too, for natural allies in the setting: Because of the attraction to academic achievement is a stronger predictor of embracing the Geek identity, as

evinced in this study, the position of Geek advocacy very likely already overlaps with extant efforts on behalf of gifted course instructors and program staff to support the identity development of their students. More so, applying these efforts to all students who might identify as a Geek during adolescence may be one way in which the advantages of a gifted education might be more fully realized across secondary education as a whole.

Specific recommendations for adapting current support strategies are facilitated by the breadth and intensity by which students who hold a pro-Geek identity engage with their favored creative activities. That is to say, working from advice like that of Hébert (2011) to "encourage involvement in extracurricular activities" (p. 166), it would be easy to imagine that focusing efforts to encourage Geeky students to engage with artistically, scientifically, and mathematically creative avocational outlets might best engage a positive interaction among the Geek identity and creative development. On its own, a culture of such advocacy in the classroom might have positive consequences by providing support related to maintaining academic success, but also may positively influence peer interactions among young Geeks who are steered toward such extracurricular activities.

Taken further, utilizing the platform of school-based or school-sponsored extracurricular activities as a medium for engagement with culturally Geeky hobbies – such as fandom writing, fan art production, cosplay, and role-playing gaming – while also thoughtfully attending to the educational opportunities of such experiences may provide the simultaneous creative, intellectual, and social reinforcements that might "organize" (as in Albert, 1992) Geeky adolescents, pushing them along positive developmental trajectories toward personal self-realization and, potentially, cultural eminence. In essence, these school-based extracurricular social environments might serve to allow the openness and freedom in microcosm that Florida (2002) indicated were most necessary to innovation, and, as such, might provide a broad spectrum of benefits, especially in terms of motivation and creativity, to young Geeks.

Implications for Future Research

This study was established deeply in the writings of ethnographers working to understand adolescent student cultures, peer interactions, and identity development. As such, an incalculable debt is owed to this body of literature for which the only remedy is to consider in the fullest sense the manner in which the present work may be a contribution to the canon of adolescent Geek studies, and most especially what opportunities might be opened for further qualitative investigations of the type which inspired the work.

This notion, that the present study may, through primarily quantitative means, enrich future studies based in a multitude of qualitative paradigms, evokes the tenet of an iterative, cyclical approach to research advanced by Teddlie & Tashakkori (2010), who argued that the overall study of a topic should "move from grounded results […] through inductive logic to general inferences (or theory) through deductive logic to tentative hypothesis or predictions of particular events/outcomes" (p. 10). In the present study, the emphasis was largely on synthesizing the grounded results and inductive logic into a testable empirical model parameterized for the explicit purpose of testing hypotheses.

From the position of a *complementarity strengths stance* (Teddlie & Tashakkori, 2003), and more explicitly one based in a multimethod approach across studies (as in Morse, 2003), this raises the question of how to make use of the present study's findings as grounds for discovering new information through inductive approaches. Here, there is at least one simple suggestion: As no prior qualitative study had previously attended to the full complexity of developmental trajectories demonstrated in the present study – each attending instead to a single trajectory, though often mentioning others in passing – a reasonable contribution to the ethnographic study of adolescent Geeks would be to capture, if at all possible, a comparison of the experiences of adolescents who are undergoing, or have recently undergone, variant identity transitions.

This would not only aid in further exploring the diversity of such transitions in adolescent identity development, but it would also aid in determining why, for example, the empirical data suggests a tendency for adolescents having undergone certain of the transitions to be attracted to specific types of creative behavior. (As mentioned earlier, this is especially interesting in terms of the attraction of Normalized Geeks to artistic creativity.) Furthermore, individual accounts of adolescents in a single group or community having experienced different pressures and, as a consequence, expressing different attitudes toward their Geek identity – as would be expected in a multifinality of the outcomes of adolescent Geek identity transition – would be a valuable approach to a further articulation of the continually evolving experiences of adolescent Geeks.

A second hoped-for contribution to the future ethnographic study of adolescent Geeks would be in calcifying, directly and through implication, the concept that – in spite of the hopes of authors like Mendick and Francis (2012) and Cross (2005) – as of 2018, the adolescent stigma of the Geek identity is still felt, and that, as this study has found, individuals who are marginal to the Geek identity appear to experience suppressed creative behavior. Even though I have offered in my conclusions the conjecture that this suppression of creative activity would come most strongly from negative experiences in the contextual role identity development of the adolescent, there was, in fact, no complete exploration of the topic, and, given the complexities of interrelated factors across social contexts, further inductive research would be strongly warranted.

Recommendations for Future Study

More than once, this dissertation study has been referred to by its author as being eclectic. Although this may have caused some difficulty in earlier phases of the work, here at the end it appears to have at least some utility, for, from this broad and somewhat rambling exploration of adolescent

Geek identity transitions, there are now many paths to take going forward. Loosely, these can be grouped into three simple categories, designated by a continued study of (1) adolescent Geeks, (2) adolescent identity development, and (3) the development of creative behavior.

Continuing the study of adolescent Geeks might entail investigating more deeply the topic of the accretive influence of generational changes in adolescent Geek crowd and role identities, especially as our American culture progresses toward greater acceptance of the Geek culture. In all, this study did little to confirm that adolescent Geeks are yet meaningfully unburdened of the Geek stigma; however, some of the findings did indicate movement in that direction. There was, for example, a definite change in the response patterns of indicators between the older participants in the pilot study and the younger participants in the full study, with the latter appearing to express comparatively less self-oriented identificatory opprobrium. This was best observed in the Liminal group and the Balanced group, whose indicator levels were not in parity with expected results. Learning more about the experiences of individuals in these two identity transition groups may, most especially, help to shed light on adolescent responses to the penetrance of the mainstream Geek chic movement into youth culture.

Another possibility for extending the model of this study into other areas of investigation may be to generalize it to adolescent identity development inherent to other avocationally-focused adolescent peer crowds. The method of capturing identity in this study, utilizing both self-reports of crowd and role identity, would be suitable to adapt for use with other crowd identities within the educational milieu, and might perhaps offer an avenue of gathering deeper insights about these identities. Elaborating on the work of Eccles and Barber (1999) and Barber, Eccles, and Stone (2001), for example, it is conceivable that their menu of stereotyped, simplified adolescent crowd identities might be demonstrated, as with the Geek identity, to contain within them internal designations for a multitude of as-yet-unconsidered developmental trajectories. As such, outcomes, creative behaviors and

otherwise, might be better situated in terms of identity development occurring as a consequence of association with these peer crowds.

And, finally, taking the whole of the composite model of creative identity development as a starting point for further examination of identity influences on creative behavior, there exists the option to adapt the method for use with alternate sources of situational identity development. It may be the case, for instance, that the creative maturation found in studies of old age related style development (Lindauer, 2003) might be the result of crucial identity transition taking place in the context of advancing through stages of middle adulthood and into older adulthood. Although this sort of identity transition would be more likely to be protracted, occurring over years rather than months (Marcia, 2002), the potential still remains to learn more about the process and its effect on creative behavior by utilizing a modified version of this creative identity development model.

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APPENDIX A

ADOLESCENT GEEK IDENTITY TRANSITIONS (AGIT) + CREATIVE ACHIEVEMENTS AND ACTIVITIES CHECKLIST (CAAC) ONLINE SURVEY INSTRUMENT

Part 1: We live in a diverse world, and among a diversity of people. There are many ways others describe us which don't always match how we describe ourselves. In this section, you should first think about the way in which your peers and classmates describe you, and later think about how you would describe yourself as you answer the following questions.

END OF PAGE 1

Select a response for each question in the grid below that best illustrates how other students at your school describe you.

	Almost Never	Rarely	Sometimes	Often	Very Often
Other students say I am very focused on school work.	○	○	○	○	○
Other students say I am ambitious.	○	○	○	○	○
Other students say I am different.	○	○	○	○	○
Other students say I am a high achiever.	○	○	○	○	○
Other students say I am intelligent.	○	○	○	○	○
Other students say I am very interested in technology.	○	○	○	○	○
Other students say I am nonconformist.	○	○	○	○	○
Other students say I am not aggressive.	○	○	○	○	○
Other students say I have unusual interests.	○	○	○	○	○
Other students say I get very excited about certain topics.	○	○	○	○	○
Other students say I am shy.	○	○	○	○	○
Other students say I am unpopular.	○	○	○	○	○
Other students say I am the type of person who values my individuality.	○	○	○	○	○
Other students say I am the type of person who values my intelligence.	○	○	○	○	○

END OF PAGE 2

Select a response between each pair of phrases below to show how strongly you feel the phrase on either side describes you. If you don't feel strongly toward either one, answer by selecting response in the middle.

I am Academically Focused	○ ○ ○ ○ ○ ○ ○	I am NOT Academically Focused
I am Studious	○ ○ ○ ○ ○ ○ ○	I am NOT Studious
I am NOT Socially Skilled	○ ○ ○ ○ ○ ○ ○	I am Socially Skilled
I am NOT Fashionable	○ ○ ○ ○ ○ ○ ○	I am Fashionable
I am NOT Popular	○ ○ ○ ○ ○ ○ ○	I am Popular
I am NOT Athletic	○ ○ ○ ○ ○ ○ ○	I am Athletic
I am a person with Obscure Interests	○ ○ ○ ○ ○ ○ ○	I am a person with Normal Interests

END OF PAGE 3

Part 2: We live in an ever-changing world, and we grow year by year. There are many ways others have described us in the past which may or may not match how we would have described ourselves. In this second section, you should again first think about the way in which your peers and classmates described you **when you were in the fifth grade**, and later think about how you described yourself at the time.

END OF PAGE 4

Select a response for each question in the grid below that best illustrates how other students at your school described you **when you were in the fifth grade**.

	Almost Never	Rarely	Sometimes	Often	Very Often
Other students said I was very focused on school work.	○	○	○	○	○
Other students said I was ambitious.	○	○	○	○	○
Other students said I was different.	○	○	○	○	○
Other students said I was a high achiever.	○	○	○	○	○
Other students said I was intelligent.	○	○	○	○	○
Other students said I was very interested in technology.	○	○	○	○	○
Other students said I was a nonconformist.	○	○	○	○	○
Other students said I was not aggressive.	○	○	○	○	○
Other students said I had obscure interests.	○	○	○	○	○
Other students said I got very excited about certain topics.	○	○	○	○	○
Other students said I was shy.	○	○	○	○	○
Other students said I was unpopular.	○	○	○	○	○
Other students said I was the type of person who valued my individuality.	○	○	○	○	○
Other students said I was the type of person who valued my intelligence.	○	○	○	○	○

END OF PAGE 5

Select a response between each pair of phrases below to show how strongly you feel the phrase on either side described you **when you were in fifth grade**. If you don't feel strongly toward either one, answer by selecting response in the middle.

I was Academically Focused	○ ○ ○ ○ ○ ○ ○	I was NOT Academically Focused
I was Studious	○ ○ ○ ○ ○ ○ ○	I was NOT Studious
I was NOT Socially Skilled	○ ○ ○ ○ ○ ○ ○	I was socially skilled
I was NOT Fashionable	○ ○ ○ ○ ○ ○ ○	I was Fashionable
I was NOT Popular	○ ○ ○ ○ ○ ○ ○	I was Popular
I was NOT Athletic	○ ○ ○ ○ ○ ○ ○	I was Athletic
I was a person with Obscure Interests	○ ○ ○ ○ ○ ○ ○	I was a person with Normal Interests

END OF PAGE 6

Part 3: In the following section, you'll be asked about the how supportive certain people or groups of people in your life are toward the idea of people being "geeks" and doing "geeky" things. In general, these words take the place of a bunch of related words, like "nerd" and "nerdy", "dork" and "dorky", and others you might have heard. When you see "geek" and "geeky", just know they mean all of these.

END OF PAGE 7

Select a response in the grid below that best describes how people in your family feel about the idea of people being geeks and doing geeky things.

	Does not describe them	Describes them slightly well	Describes them moderately well	Describes them very well	Describes them extremely well	Other/I don't know
Members of my family are happy with people being geeks.	○	○	○	○	○	○
Members of my family appreciate geeky things.	○	○	○	○	○	○
Members of my family are interested in geeky activities.	○	○	○	○	○	○
Members of my family are enthusiastic about geeky things.	○	○	○	○	○	○

Select a response in the grid below that best describes how people in your group of friends (both in school and outside of school) feel about the idea of people being geeks and doing geeky things.

	Does not describe them	Describes them slightly well	Describes them moderately well	Describes them very well	Describes them extremely well	Other/I don't know
My friends are happy with people being geeks.	○	○	○	○	○	○
My friends appreciate geeky things.	○	○	○	○	○	○
My friends are interested in geeky activities.	○	○	○	○	○	○
My friends are enthusiastic about geeky things.	○	○	○	○	○	○

Select a response in the grid below that best describes how the adults at your school (your teachers and other administrators) feel about the idea of people being geeks and doing geeky things.

	Does not describe them	Describes them slightly well	Describes them moderately well	Describes them very well	Describes them extremely well	Other/I don't know
Adults at my school are happy with people being geeks.	○	○	○	○	○	○
Adults at my school appreciate geeky things.	○	○	○	○	○	○
Adults at my school are interested in geeky activities.	○	○	○	○	○	○
Adults at my school are enthusiastic about geeky things.	○	○	○	○	○	○

END OF PAGE 8

Part 4: In the following section, you'll be asked some questions about yourself. Remember, if you don't want to provide an answer, you don't have to. Just leave the question blank.

END OF PAGE 9

What is your gender?

- Male
- Female
- Other

What level of education do your parents/guardians have?

- Some High School
- High School Diploma
- Some College
- College Degree
- Graduate Degree

How would you describe your grades in school?

- All As
- Many As
- Some As
- A Few As
- No As

What year were you born?

What year did you enter middle school?

What is your cultural background?

END OF PAGE 10

Part 5: Finally, you're going to be asked some questions about some activities you've done and accomplishments you've made. There are six categories you'll be answering questions for: Writing, Music, Art, Math/Science, Technology, and Everyday Creativity.

END OF PAGE 11

These questions ask you how often you've had experiences related to writing. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Joined in a writer's club or similar organization?	○	○	○	○
Written a poem?	○	○	○	○
Kept a personal journal and added to it regularly?	○	○	○	○
Written a short story?	○	○	○	○
Written something humorous, such as jokes, limericks, satire, etc.?	○	○	○	○
Won an award for something you wrote in a competition?	○	○	○	○
Published something you wrote in a school-wide magazine or newsletter?	○	○	○	○
Represented your class or school for a writing competition or writing fair?	○	○	○	○
Been recognized by your classmates or your school for your writing?	○	○	○	○

END OF PAGE 12

These questions ask you how often you've had experiences related to music. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Composed a song?	○	○	○	○
Performed with a musical instrument?	○	○	○	○
Recorded your own ringtone or music for your cellphone?	○	○	○	○
Remixed music on a computer?	○	○	○	○
Won an award in a musical competition?	○	○	○	○
Performed music in public (e.g., music performance or a talent show)?	○	○	○	○
Represented your class or school in a musical competition or talent show?	○	○	○	○
Been recognized by your classmates or your school for your musical talent?	○	○	○	○

END OF PAGE 13

These questions ask you how often you've had experiences related to art. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Painted an original picture?	○	○	○	○
Drawn cartoons?	○	○	○	○
Drawn a picture just to express an idea or feeling?	○	○	○	○
Taken and developed your own photographs?	○	○	○	○
Received an award in an art competition?	○	○	○	○
Displayed your artwork in public or printed in a school-wide magazine?	○	○	○	○
Represented your class or school in an art competition or art fair?	○	○	○	○
Been recognized by your classmates or your school for your artwork?	○	○	○	○

END OF PAGE 14

These questions ask you how often you've had experiences related to math and science. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Constructed something that required scientific knowledge, such as a radio, telescope, or scientific apparatus?	○	○	○	○
Applied math/science in an original way to solve a practical problem?	○	○	○	○
Dissected a plant or an animal?	○	○	○	○
Conducted an original experiment?	○	○	○	○
Joined in a science and/or math club or organization?	○	○	○	○
Won an award in a math/science competition (e.g., math/science league)?	○	○	○	○
Presented a math/scientific project in a fair?	○	○	○	○
Represented your class or school in a math/science competition?	○	○	○	○
Been recognized by your classmates or your school for your math/science accomplishments?	○	○	○	○

END OF PAGE 15

These questions ask you how often you've had experiences related to technology. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Designed a website or created a blog?	○	○	○	○
Updated posts in a website or blog?	○	○	○	○
Touched up digital photos on a computer?	○	○	○	○
Edited a video taken with your phone or digital camera?	○	○	○	○
Won an award in a computer/informative technology competition (e.g., robot or computer programming)?	○	○	○	○
Been asked to create or maintain a website (e.g., Facebook) or blog as a web host for your class or club?	○	○	○	○
Represented your class or school in a computer/informative technology competition?	○	○	○	○
Been recognized by your classmates or your school for your computer/informative technology skills?	○	○	○	○

END OF PAGE 16

These questions ask you how often you've had experiences related to everyday creativity. Select the answer that best matches your experience. You may need to provide an approximate answer. If you do, just select the answer that comes closest.

	Never	Once or Twice	3 - 5 Times	5+ Times
Designed or made tools or objects for daily life (e.g., household tools or something to help with schoolwork)?	○	○	○	○
Planted or kept a garden?	○	○	○	○
Cooked a meal or one dish without following a recipe?	○	○	○	○
Made your own game?	○	○	○	○
Come up with jokes that became popular among your friends?	○	○	○	○
Seen that your friends shared your post(s) in social media?	○	○	○	○
Been recognized by your classmates for suggesting fun games to play or changing game rules to make it funnier?	○	○	○	○
Been recognized by your classmates or your school for anything that you made as a hobby?	○	○	○	○

END OF PAGE 17

APPENDIX B

ONLINE PARTICIPATION ANNOUNCEMENTS

First Announcement

Howdy Y'all!

Are you interested in helping further the study of creativity in young adults and Teens? Well then boy do I have the study for you! My father, Jeremiah Piña, is currently trying to do his pilot study for his dissertation at UGA and he has asked me to send it to you, my followers! The purpose of this study is to collect data on teen nerd identity change. The survey is anonymous. You don't have to give your name for the study to complete it, and participation is entirely voluntary.

The link for the survey is: https://ugeorgia.qualtrics.com/jfe/form/SV_eP6npCaf9rHEeeF

I really appreciate y'all helping out ahead of time!

Feel free to reblog and share the study!

Also, if you have any questions, send me an email. I'm at elrick.ice@gmail.com.

Second Announcement

Hey again, Friends! I'd like to thank you all for participating in my father's pilot study if you've already done it! If you *haven't* had the opportunity to take it yet, it's still open.

The purpose of this study is to collect data on teen nerd identity change and my dad has asked me to help find a pilot group from my Tumblr followers. The survey is anonymous, you don't have to give out your name for it, and it's voluntary – you don't have to take it if you don't want – but I would greatly appreciate it if you all would take it!

The link for the survey is: https://ugeorgia.qualtrics.com/jfe/form/SV_eP6npCaf9rHEeeF

Thank you all ahead of time! I really appreciate you all helping me! Feel free to reblog and share this post.

If you have any questions, shoot me an email at elrick.ice@gmail.com!

Third Announcement

Hey guys! This is the survey that I was talking about! It's meant for people ages about 11-16! If you have kids or are within that age range I would really appreciate you completing the survey! It's meant to help understand creative development in adolescents. The survey has about 100 questions. We'd be really thankful if you'd complete them all and it should only take up about 25 minutes at most.

This survey is being done by Jeremiah Piña at the University of Georgia. I'm the community manager for the study group (You guys!). The Survey is anonymous!

If you have any questions about the survey you can contact me or Jeremy at these email addresses respectively:

elrick.ice@gmail.com

jpina@uga.edu

Thanks ahead of time! **Please feel free to reblog!**

Fourth Announcement

Howdy Y'all! I really appreciate y'alls help with the survey so far! This is the second and final round of the survey and we've decided to extend the available age range to 11-18. Everything else about the survey is the same: about 100 questions, it'll take 25 minutes to fully complete it, and it's anonymous.

This survey is being done by Jeremiah Piña at the University of Georgia. I'm the community manager for the study group (You guys!). The Survey is anonymous!

If you have any questions about the survey you can contact me or Jeremy at these email addresses respectively:

elrick.ice@gmail.com

jpina@uga.edu

Thanks ahead of time! **The age range is now 11-18. Please feel free to reblog!**

APPENDIX C

MIDDLE SCHOOL PARTICIPATION PACKET

Hello!

My name is Jeremiah Piña. I'm a doctoral student at the University of Georgia, and I'm hoping that you'll help me out. I'm investigating the topic of how thinking about yourself as a geek or nerd in middle school changes over time and how that change can affect your creativity. My intention is that, by understanding these relationships, I can help your parents and teachers to make your middle school a better, more supportive, and more creative place to be.

In order to do this, I'm asking you to fill out a web-based survey that I've created. The survey has just over 100 questions, and will take about 15-20 minutes of your time. You don't have to consider yourself to be a geek or nerd to fill out the survey: It's open to any student.

Getting access to the survey is a simple, three-step process. First, you'll need to have a parent or guardian sign and date the parental consent form that comes in this packet (page 2); second, you'll need to sign and date your consent form, indicating you want to participate in the study (page 3); and, finally, you'll need to return this packet with a **valid email address** (also on page 3) to receive the link to the survey.

If you have any questions about the study, or if you'd like more information, you can get in contact with me at jeremiah.alec.pina@gmail.com.

Thank you so much for your consideration!

Ad Astra,

Jeremiah Piña

To Parents/Guardians:

As mentioned in the announcement introduction, my name is Jeremiah Piña and I'm a doctoral student at the University of Georgia under the direction of Dr. Mark Runco.

Contributing to the completion of my dissertation, I'm carrying out a study entitled *Adolescent geek identity transitions and their role in shaping the creative activities and accomplishments of middle school students*, the purpose of which is to explore the nature of young students' identity changes referencing the social and personal identities of geeks, to investigate the situational influences of peer, home, and educational environments on these identity changes, and, additionally, to determine the effect of this type of identity change on the expression of creative behavior.

My goal throughout this process is to provide a medium for an open, welcoming dialogue while, at the same time, offering an opportunity for students to contribute to the study by completing a web-based survey. In part to facilitate this sense of openness, I want to highlight that participation in the study is entirely voluntary. Your child may choose to end their participation at any time without penalty.

Information collected in this study does not contain identifiers and is generally treated as being anonymous. However, this survey study involves the transmission of data over the internet. While every reasonable effort has been taken to ensure the effective use of available technology, confidentiality during online communication cannot be guaranteed. In any case, publications utilizing data collected from this pilot study will make no use of identifying information.

While the study does not directly benefit student participants, it is intended that participants will benefit indirectly as a result of raising awareness of the role of creative activities as a part of the unique experience of adolescent geeks. Further, it is hoped that this dissertation study will aid students, parents, and educators in understanding the importance of supporting geeky or nerdy students in the middle school environment.

There are no known risks resulting from participation in this study. If, however, any questions in the survey would make your child feel uncomfortable, they are free to skip them. Should you have any questions about this research project, please feel free to contact me at jeremiah.alec.pina@gmail.com or my faculty advisor at runco@uga.edu. Additionally, if you have any questions or concerns about your child's rights as a research participant, you may contact the Chairperson, University of Georgia Institutional Review Board (IRB) by telephone at 706-542-3199 or by email at irb@uga.edu.

Parental Consent. To allow your child to take part in this study, please sign and date below. Your signature indicates that you have read and understand the terms of the study and agree to allow your child to participate.

_____ _____

Parent/Guardian's Signature **Date**

To Students:

Toward the middle of this page, there is a place to sign showing that you want to participate in the study and a place to provide your email address so that you can receive the survey link. Please keep in mind that participation in this study is meant to be completely voluntary. If you don't want to participate, you don't have to, and even if your parent signs saying they'll let you join the study, you can still decide that you don't want to participate. You can change your mind at any time without any consequences.

That said, I want to thank you again for thinking about being a part of this study, and I want to offer again that if you have any questions, you can reach out to me at jeremiah.alec.pina@gmail.com, and I'll gladly provide what information I can.

Student Consent. To take part in this study, please sign and date below. Your signature indicates that you have read and understand the terms of the study and agree to participate.

_____ _____

Student's Signature **Date**

Email Address Information. On the line below, please print, clearly and legibly, an email address to which the link to the survey can be sent. Once this document is processed, in about 3 days, you'll receive an email from my address, jeremiah.alec.pina@gmail.com. If you do not receive an email from me and you have completed this packet (with both your parents/guardians and your signatures), please make a request by contacting me directly, and I can send you a link to the survey.

_____

Email Address

APPENDIX D

A SAMPLE OF DESCRIPTIVE CHARACTERISTICS UTILIZED IN PRIOR STUDIES OF ADOLESCENT GEEKS

Rentzsch, Shutz, & Schroeder-Abe (2011)	Bishop et al. (2003)	Anderegg (2007)	Bosson, Weaver, & Prewitt-Freilino (2012)	Bucholtz (1999)	Chau (2014)	Cross (2005)	Currie, Kelly, & Pomerantz (2006)	Francis, Skelton, & Read (2010)	Garner et al. (2006)
Ambitious	Brilliant	Smart	Valuing intelligence	Valuing intelligence	Not stylish	Too smart	Not stylish	High-achieving	Smart
Intelligent	Academic achiever	Uninterested in personal appearance	Not valuing social pursuits*	Not cool	Wears glasses	Academically focused	Against the idea of popularity	Not sociable	Bookworm
Good grades	Studious	Physically weak	Not valuing athletics*	Valuing individuality	Plain	Overbearing	Nonconformist	Not fashionable	Loner
Studying a lot	Not socially skilled	Unsexy	Bookish	Against the idea of popularity		Shy	Different	Not attractive*	Mentally handicapped
Displaying success publicly	Nonathlete	Persecuted by jocks	Interest in obscure topics			Socially inadequate	Weird	Unpopular	Physically handicapped
Shy	Not aggressive	Interested in technology				Uninteresting			
Having few friends	Not popular	Enthusiastic about boring stuff				Physically weak			
Not fashionable						Undesirable			
Not athletic						Helper			
Not attractive						Passionate expert			

* Indicates that the descriptor was indirectly attributed to Geeks in the work