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**UNDERSTANDING ATTRACTION, BEHAVIOR, AND IDENTITY
IN THE ASEXUAL COMMUNITY**

by

Corey Doremus

A Thesis

Submitted to the
Department of Psychology
College of Science and Mathematics
In partial fulfillment of the requirement
For the degree of
Master of Arts in Clinical Psychology
at
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Thesis Chair: Meredith Joppa, Ph.D. and DJ Angelone, Ph.D.

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Dedication

This thesis is dedicated to my wife, whose tireless support and love can not adequately be put into words. Thank you for never doubting my ability, even when I did.

Acknowledgments

I'm unable to quantify my thanks for my incredible mentors Dr. Meredith Joppa and Dr. DJ Angelone. Without their guidance and patience there's simply no way this thesis would exist. I am incredibly honored to have the opportunity to benefit from their continued support of my personal and professional growth.

Abstract

Corey Doremus
UNDERSTANDING ATTRACTION, BEHAVIOR, AND IDENTITY
IN THE ASEXUAL COMMUNITY
2019-2020

Meredith Joppa Ph.D. and DJ Angelone Ph.D.
Master of Arts in Clinical Psychology

Models of sexuality have evolved substantially in the past several decades through the inclusion of new aspects which were previously overlooked. Components such as romantic attraction and behavior have also traditionally been included in models of sexuality. However, romantic and sexual orientations do not coincide for all individuals. A population for which this is true and one that has developed a robust language for discussing romantic orientation is the asexual community. The current study aims to examine romantic and sexual orientation through patterns found within the factors of attraction, behavior, and identity in the asexual community. Within this sample, aspects of each factor such as fluidity, number and type of self-identified labels, desire for romance or sex, and the role of contextual influences were the primary characteristics within groups of similar participant approaches. These findings provide a mechanism for better understanding of some nuances of romantic and sexual orientation and may be a useful first step toward future inquiry and hypothesis generation.

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Chapter 1

Introduction

Our understanding of human sexuality has continually evolved beyond existing systems for categorizing sexual orientation. For example, Alfred Kinsey recognized that the sexual orientations of “heterosexual” and “homosexual” were not all-inclusive. As a result, he developed a seven-point spectrum representing a wider variety of experiences than the previously dichotomous understanding (Kinsey et al., 1948). Similarly, researchers have attempted to examine the sexual and romantic desires of individuals. However, research often conflates participants’ romantic and sexual lives and ultimately limits our understanding of the diverse experiences of human sexuality. Over time, development of additional taxonomy models seems to have more fully captured the sexual and romantic realms of individuals. For example, Sexual Configurations Theory (SCT) includes non-sexual elements such as romantic desires and attractions as one way of defining partnered sexualities (Schudson et al., 2017; van Anders, 2015). Given the diversity inherent to humans and their engagement in sexual and romantic behavior, there is an ongoing need to evaluate and expand our conceptualization of romantic and sexual orientation.

Current definitions of sexual orientation include both sexual *and* romantic attraction, behavior, and identity (Lehmiller, 2017). Typically, “romantic” refers to aspects of interpersonal relationships that can include physical intimacy, love, the sharing of resources, and exclusivity, although there is considerable variability within these dimensions between individuals (Furman & Hand, 2006). Conversely, “sexual” refers to

sexual desires and behavior between partners. However, some individuals and their partners may be unable to fully describe their experiences using currently available sexuality labels and conceptualizations (Schudson et al., 2017; van Anders, 2015). For example, if an individual engages in sexual activity with both men and women, they may self-identify as bisexual. Their romantic desires and behaviors may not affect how they choose to identify, so if they only desire romance with women, this would not be reflected in the label they use for their sexual orientation. In contrast, if an individual experiences sexual attraction to only men, but desires to engage in sexual activity with one specific woman, there is no way to reflect this using traditional labels.

Sexologists have largely studied romantic and sexual orientation under the assumption that they are in complete agreement, and this conflation extends to the associated identity labels. While sexual and romantic orientation may very closely overlap for some people, this is not true for many other individuals (Diamond, 2003; van Anders, 2015). As noted above, the Kinsey model of sexual orientation fostered enhanced understanding of sexuality by increasing the available choice of labels (Diamond, 2003; Kinsey et al., 1948). However, while sexual orientation labels are parsimonious, they commonly fail to completely capture the experiences of an individual and do not account for the significant variations in attraction and behavior between people (Diamond, 2003, 2004). While the term “orientation” has been defined in many ways, the current manuscript (see Glossary) defines orientation as an overall profile composed of the factors of attraction, behavior, and identity (Lehmiller, 2017; van Anders, 2015). “Sexual orientation” refers *only* to the profile composed of an individual’s sexual attraction,

behavior, and identity, while “romantic orientation” likewise refers only to the profile of an individual’s romantic attraction, behavior, and identity. Adding to this complexity is a concept known as fluidity whereby one or more of these dimensions can shift over time, (Katz-Wise & Hyde, 2015; Savin-Williams & Diamond, 2000). Essentially, fluidity refers to a shift in part of an individual’s orientation, such as shifting from being attracted to men to being attracted to women. Fully understanding how a person experiences the romantic and sexual realms of their life begins with closely examining sexual and romantic attraction, behavior, and identity.

Attraction

Sexual attraction refers to an individual’s feelings and experiences of sexual desire towards an external entity (Brotto & Yule, 2011). This attraction can be constrained along dimensions such as gender, biological sex, and interpersonal closeness (Diamond, 2003; Fisher, 1998; Hazan & Diamond, 2000). A person can experience sexual attraction toward someone outside of their self-reported sexual identity, such as a man who identifies as heterosexual being sexually attracted to another man. These attractions also do not necessarily lead to an individual desiring to engage in a specific sexual behavior with the object of their attraction (Diamond, 2003; McCabe & Collins, 1984). For example, someone may only want to kiss a person they are sexually attracted to but may not desire to have sex with them. It may seem counterintuitive that sexual attraction and desiring to engage in a specific sexual behavior are not the same thing, but this only serves to highlight the need for expansion of our understanding of these concepts.

Romantic attraction refers to an individual's feelings and experiences of romantic desire towards other people (Fisher et al., 2006). It exists alongside sexual attraction yet is distinct as both a system and a concept. Interpersonal intimacy and relationships are major components of this system of attraction, and it typically takes longer to develop than sexual attraction (Fisher et al., 2006; Hazan & Diamond, 2000; Whisman & Allan, 1996). Although the traditional belief is that romantic attraction closely aligns with sexual attraction, there is recent evidence to suggest it may be more accurate to study these systems separately (Diamond, 2004; Fisher et al., 2006; Hazan & Diamond, 2000; Sprecher & Regan, 2002).

Individuals can experience sexual attraction entirely separate from romantic attraction (Diamond, 2004; Fisher et al., 2006). Romantic attraction without accompanying sexual attraction also occurs, as these systems are distinct (Diamond, 2000; Savin-Williams, 2014; Sprecher & Regan, 2002). There is evidence for these systems being separate from the fields of attachment and physiology (Diamond, 2004; Fisher, 1998; Fisher et al., 2006; Whisman & Allan, 1996). For example, attachments between close friends have many of the same features as adult romantic pair bonding, such as desire for proximity, resistance to separation, and utilizing the partner as preferred target of comfort (Diamond, 2000; Hazan & Diamond, 2000). Further, the neurochemical pathways are distinct and largely separate for sexual and romantic attraction (Diamond, 2003, 2004; Fisher et al., 2006). Essentially, the various theoretical approaches to human attraction suggest a higher degree of nuance to these systems than

current models can provide. While attraction exists wholly within an individual, external behaviors are also a major factor in how a person engages in romance or sex.

Behavior

Sexual behaviors include kissing, heavy petting, oral or manual stimulation, and penetrative intercourse (Gribble et al., 1999). These behaviors can occur with or without any associated romantic behaviors. Frequently, people engage in casual or non-romantic sexual acts with others entirely free of any romantic attraction (Diamond, 2003; Fisher, 1998). Many sexual behaviors occur without any partner at all, while some by definition require one (or more) partners. Many activities do not fit neatly into categories such as “sexual” or “romantic,” activities such as passionate kissing, which can be viewed as either or both a sexual and romantic behavior depending on the importance that an individual places on it and the specific context in which it occurs (Prause & Graham, 2007). The difficulty in clearly assigning behaviors such as kissing or cuddling to only the romantic or sexual realm speaks to a significant limit within current models of both sexual and romantic orientation.

Romantic behaviors refer to many non-sexual partnered activities that depend on varying levels of interpersonal intimacy, ranging from hand-holding to cuddling (Sprecher & Regan, 2002; Whisman & Allan, 1996). Even non-contact behaviors such as spending time together, disclosing personal or intimate emotions, or sharing finances can be viewed as romantic behavior (Ledbetter, 2012). Many romantic behaviors serve to initiate, maintain, or strengthen close interpersonal relationships and deepen the bonds that individuals share. These bonds are not strictly unique to romantic partners: for

example, these same characteristics are present in intense friendships (Diamond, 2000; Sprecher & Regan, 2002). While some historical models of human sexuality have focused heavily on attraction in defining sexual orientation (Kinsey et al., 1948), behaviors are the most visible aspect of an individual's sexual and romantic life and play an integral role in self-identity (Diamond, 2003; Fu et al., 2019; Savin-Williams, 2014; Savin-Williams & Diamond, 2000).

Identity

Sexual identity refers to how individuals choose to label their sexual preferences, but also includes additional aspects of personality and gender identity that extend beyond sexual orientation (Savin-Williams, 2014). Sexual identity can also impact other aspects of life, in that someone may closely relate to others with similar identities (Bauermeister et al., 2010). One example of this is AVEN (the Asexuality Visibility and Education Network), a site dedicated to fostering community and discourse among people identifying as asexual. Sexual identity is not a static characteristic for many individuals: their identities are influenced by, and in turn have an impact on, the level of sexual fluidity they experience (Katz-Wise & Hyde, 2015).

Romantic identity refers to how an individual chooses to label their romantic preferences (Diamond, 2003). For many people, romantic and sexual preferences closely align, and they may never consider examining them separately. However, for individuals who have distinct romantic and sexual preferences, separate identities can help to communicate these preferences both to themselves and to others. For example, an individual may be sexually interested in both men and women but may desire romantic

interactions with men only. In contemporary language, this individual may self-identify based on either their sexual (bisexual) or romantic (homoromantic) preferences, but they may not always weigh both equally (Fu et al., 2019; Savin-Williams & Diamond, 2000). The complex and frequently limiting bounds of current romantic and sexual taxonomy is especially salient to many sexual minority groups, such as the asexual community.

The Asexual Community

People who identify as asexual do not typically experience sexual attraction to others (Yule et al., 2017). According to recent estimates, approximately 1% of the global population is asexual (Bogaert, 2004; Yule et al., 2017). As asexuality has frequently been portrayed and understood as a symptom of psychopathology in the past, research informed by members of this group is paramount (Bogaert, 2006; Scherrer, 2008). Members of this population frequently connect with peers through online communities such as the Asexual Visibility and Education Network (AVEN). Because sexual attraction is not the primary focus of relationships for many of these individuals, the asexual community has developed a shared language which encapsulates *romantic* attraction, in terms of target genders, frequency, and intensity, to a greater extent than many other sexual orientation communities (DeLuzio Chasin, 2011). Examining romantic attraction in the asexual community is one way in which we can identify patterns of attraction, behavior, and identity that comprise romantic orientation.

The Current Study

Romantic and sexual attraction, behavior, and identity are interrelated (Diamond, 2003; Fisher et al., 2006; Lehmilller, 2017). Individuals engage in each of these areas of

their lives using characteristic approaches, which are the overall manner in which they actively experience the romantic and sexual realms of their lives (van Anders, 2015). As an individual's approach is not completely static and can shift over time, their current approach can be represented as a profile that describes a snapshot of their romantic and sexual orientations. Essentially an individual's approach is how they engage in romantic or sexual activity and relationships, and their profile is a snapshot of their approach made up of the factors of romantic and sexual attraction, behavior, and identity. Additionally, individuals have profiles of each factor (attraction, behavior, and identity) that represent the specific ways they engage with each factor, such as what romantic behaviors they like to do or what types of attraction they experience. However, it is unknown how attraction, behavior, and identity specifically relate to an individual's overall orientation, or which factors are most influential. The current study is an exploratory examination of romantic and sexual attractions, behaviors, and identities among self-identified members of the asexual community. We examined patterns of similarity across both factor (attraction, behavior, and identity separately) and composite (attraction, behavior, and identity variables together) profiles of individuals. The "complete" profile includes all factors (romantic and sexual attraction, behavior, and identity, as well as gender identity), while the factor profiles for attraction, behavior, and identity *only* include responses within their respective category. We hypothesized that the complete profiles would display overall similarity along one of the component factors (e.g. romantic identity or sexual attraction).

Given the exploratory nature of this study, we did not hypothesize a specific number or form of clusters. Instead, we believed that individuals would endorse complex

patterns of these factors and that patterns of similarity would be present between individuals. We believed that this similarity would exist both within and between romantic identity groups. Notably, we attempted to categorize patterns within each factor, not within each individual. Examination of patterns within these factors and clusters will add to the literature in that it will provide useful directions for both future hypothesis generation and conceptualizations of sexuality. This will allow for a better understanding of which aspects of factors are important, both within the current sample and to the broader concepts of sexual and romantic orientations. To do this we examined key aspects of these factors, such as the number of shifts in attraction an individual has experienced, their desire to engage in specific romantic and sexual behaviors (and associated contextual considerations), the labels an individual chooses with which to self-identify their gender, orientation, and relationships, as well as others. The purpose of this study is not to categorize people or introduce a new taxonomy model of human sexuality into the literature; rather, the primary aim is to identify and examine patterns of attraction, behavior, and identity and which aspects of these factors are most salient for an individual's approach. In order to accomplish this goal, our data analytic strategy is focused on examining patterns of similarity and dissimilarity between individuals at the profile level. Examining an individual's profile will allow for a better understanding of how they experience the romantic and sexual realms of their life, and this requires examining sexual and romantic attraction, behavior, and identity.

Chapter 2

Method

Participants

Our sample included 306 asexual-identifying individuals, recruited from regional listservs and an online community for asexual-identifying individuals, the Asexual Visibility and Education Network (AVEN). Following approval from the Institutional Review Board, all questions were presented via an online Qualtrics survey. A link to the survey and a short general description of what types of questions would be asked was posted at a rate of approximately once per month. Participants completed a short screening questionnaire to report their gender and sexual orientation, and individuals who did not identify as asexual were excluded as the present study aimed to examine only patterns of romantic attachment in asexual-identifying individuals. Table 1 displays relevant sociodemographic information from our sample. Our sample was largely female (61%), although nearly a quarter either identified as non-binary (13%) or self-described their gender identity (10%). Our sample was predominantly White (81%), with much smaller proportions of participants identifying as Asian (5%), African American/Black (4%), and multi-racial (6%). There was a relatively large age range (18-66), although the mean age was 27.1 ($SD = 8.9$).

Table 1

Demographic Information

Demographic Variable	Response	N	%
Gender	Female	185	61%
	Male	48	16%
	Non-Binary / Third Gender	41	13%
	Self-described	29	10%
	Did not disclose	3	1%
	Transgender	36	12%
Race / Ethnicity	Caucasian / White	247	81%
	Asian	16	5%
	African American / Black	12	4%
	Multiracial	19	6%
	Other	10	3%
	Did not disclose	2	1%
	Latinx	17	6%
Romantic Orientation	Aromantic	103	34%
	Heteroromantic	64	21%
	Gray-romantic	62	20%
	Panromantic	69	23%
	WTFromantic	37	12%
	Biromantic	60	20%
	Homoromantic	19	6%
	Lith(Akoi)romantic	11	4%
	Demioromantic	60	20%
	2 choices	63	21%
	3 choices	8	3%
	More than 3 choices	5	2%
	Did not disclose	9	3%
	Relationship Status	Single and not looking	165
Single and dating / looking		70	23%
Committed relationship		24	8%
Casual relationship		3	1%
Engaged		2	1%
Married / Partnered		7	2%
Queer Platonic Relationship		15	5%
Other		20	7%

Table 1 (continued)

Demographic Variable	Response	N	%
Desire to Engage in Romance	Don't experience romantic attraction/desire	89	29%
	Don't want or need to engage	101	33%
	Would engage for partner, but doesn't seek it	89	29%
	Desires but does not engage	94	31%
	Only desires if strong emotional connection	122	40%
	Desires non-romantic relationship	142	46%
	Other	20	7%
	Multiple responses	216	71%
Desire to Engage in Sexual Activity (SA)	Don't experience sexual attraction or arousal	142	46%
	Don't want or need to engage in SA	224	73%
	Would engage in SA for partner, but doesn't seek it themselves	109	36%
	Doesn't want SA with partner, uses masturbation	136	44%
	Feels neutral toward sex, doesn't need it	70	23%
	Desires and enjoys sex, but doesn't need it	15	5%
	Only desires to engage in SA with a strong emotional connection	37	12%
	Other	37	12%
Change in Romantic Attraction	No	107	35%
	Yes - once	155	51%
	Yes- more than once	44	14%
Change in Sexual Attraction	No	229	75%
	Yes - once	49	16%
	Yes- more than once	24	8%

Note: Percentages sum to more than 100%, multiple responses were possible for many of the items and all responses are displayed separately here

As the concept of romantic orientation is frequently discussed within the asexual community, participants also answered a series of questions regarding their preferred romantic orientation identity label. Nearly a quarter of our sample identified as aromantic (23%), 10% as heteroromantic, 9% as panromantic, 8% identified as biromantic, 10% as gray-romantic, 9% as WTFromantic, 2% as homoromantic, 1% as demiromantic, and 2% as lithromantic. Additionally, 21% of participants identified with two romantic orientation labels, 3% identified with three labels, 2% identified with more than three labels, and 9% self-described their orientation.

Measures

Sociodemographics. We gathered information regarding the sociodemographic backgrounds of participants via seven questions, including one age item, two items about race/ethnicity, two items regarding relationship status, and two items regarding self-identified LGBTQIA+ group membership: “Do you consider yourself a member of the lesbian, gay, bisexual, transgender, etc. (LGBT+) community?” and “Do you feel welcome and accepted in the LGBT+ community? Please use the sliding scale to indicate the degree to which you feel welcome.”

Attraction. The construct of sexual attraction was assessed using two measures: The Sexual Fluidity in Attractions and Sexual Orientation Identity Scale (Katz-Wise & Hyde, 2015) and The Sexual Fluidity Beliefs Scale (Diamond, 2005). Shifts in attraction are also assessed in both measures, based on frequency and duration. All measures in this study were used only for the item responses and were not scored as a complete measure, therefore no scale-level statistics are presented or utilized.

The Sexual Fluidity in Attractions and Sexual Orientation Identity Scale is a 10-item dichotomous (*yes/no*) scale designed to assess sexual fluidity in both attraction and identity (Katz-Wise & Hyde, 2015). Sample questions include “have you ever experienced a change in attractions to others over time (e.g., feeling only attracted to women, then feeling attracted to both women and men)?” Answering *yes* to these items leads to further questions regarding the specific number of changes in attraction that have been experienced. There is also an item regarding fluidity beliefs, “How likely is it that your attractions or sexual identity will change in the future?” which was measured on a scale from 1 (extremely unlikely) to 5 (extremely likely).

The Sexual Fluidity Beliefs Scale (Diamond, 2005) is a 5-item measure that assesses beliefs regarding sexual fluidity, and contains items such as “I feel my own sexual identity (how I label my sexual orientation) is something I chose” and “I don’t know how I will label my sexual orientation in the future,” measured on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree).

The construct of romantic attraction was measured using a modified version of The Sexual Fluidity Beliefs Scale (Diamond, 2005) to include romantic attraction in place of sexual attraction. Items include, “I feel my own romantic identity (how I label my romantic orientation) is something I chose” and “I don’t know how I will label my romantic orientation in the future”, measured on a 7-point Likert scale from 1 (completely disagree) to 7 (completely agree).

Behavior. The construct of sexual behavior was assessed using The Depth of Sexual Involvement Scale (McCabe & Collins, 1984). The Depth of Sexual Involvement Scale is a 12-item measure that includes items on sexual behaviors and the contexts and level of desire in which these behaviors occur developed by McCabe and Collins (1984).

The romantic behavior construct was measured using The Relational Maintenance Communication Scale (Ledbetter, 2012). The Relational Maintenance Communication Scale is a 39-item instrument that includes items regarding past and future behaviors across 11 relationship-centered dimensions (Ledbetter, 2012). A sample item is “talking in ways that express love and give attention and affection”.

Identity. Sexual, romantic, and gender identity were measured via researcher-generated items. These items were refined with feedback from LGBTQIA+ student focus groups. There were eight items about romantic and sexual orientations and four items regarding gender identity and expression. Items regarding romantic and sexual orientations included questions such as, “Which of these terms, if any, do you use to describe your sexual orientation? Please check all that apply” with a list of nine romantic orientation labels derived from community sources, followed by, “Thinking about the term(s) you used to describe your romantic orientation, what does this term mean to you?” Slider scales of 0-100 were included for items regarding gender identity (female/woman/girl; male/man/boy; other genders), gender expression (feminine; masculine; other/androgynous), sexual attraction (women; men; androgynous/other gender), and romantic attraction women; men; androgynous/other gender).

Chapter 3

Results

Analytic Procedure

Our data analytic strategy focused on examining patterns of similarity and dissimilarity between individuals at the profile level, using t-distributed Stochastic Neighbor Embedding (tSNE). We used factor profiles (attraction, behavior, and identity) as well as the composite profile (all three factors together). tSNE is a fundamentally exploratory dimensionality reduction technique useful for visualizing high-dimensional data (van der Maaten & Hinton, 2008). tSNE produces 2- or 3-dimensional plots wherein data points are clustered based upon maximizing similarity at both the local (between individual regions of a profile) and global (between overall profiles) levels (van der Maaten, 2009). In other words, tSNE groups data based upon similarity across many different dimensions. Applying this procedure to the current high-dimensional data involved transforming every potential answer to each survey question into a binary vector representing each participant's response profile. Each participant profile constitutes a single data point in the tSNE analysis, and these data points are compared for pairwise similarity with all neighboring datapoints over many iterations. The goal of this comparison is to minimize the Kullback-Leibler divergences across all datapoints, which represents the fidelity of the lower-dimensional representation in modeling high-dimensional data (van der Maaten, 2009; van der Maaten & Hinton, 2008). Essentially, this can be thought of as minimizing the distance between similar data points (based on similarity) in a high-dimensional space and representing that in a 3-dimensional plot.

This process yields clusters composed of individual profiles which are most similar across all responses.

tSNE contains several tunable hyperparameters that modify how similarity across data points is determined, and the most important hyperparameter is “perplexity.” Perplexity is a value that indirectly represents the amount of nearby data points that are compared with each iteration, with lower values of perplexity leading to fewer checked “neighbors” and more localized clustering (van der Maaten, 2009). In other words, changing the value of perplexity results in the comparison of different amounts of data points. Best practices for tSNE involve multiple iterations of each plot with varying hyperparameters until a stable cluster structure emerges (Belkina et al., 2018; van der Maaten & Hinton, 2008). As this process is also non-deterministic, subsequent runs with similar or identical hyperparameters can yield slightly different plots (van der Maaten & Hinton, 2008). Once a set of hyperparameters that leads to defined clusters is found, multiple runs are conducted. However, the differences in plots are not drastic between runs, which is the main reason that multiple runs need to be observed and the most easily interpretable selected.

We aggregated participants’ responses to all of the measures to create profiles. Each individual has four profiles 1) attraction, 2) behavior, 3) identity, and 4) an overall profile comprised of all three of these factors. An individual’s factor profile is therefore representative of their experience within the respective factor. For example, an individual’s attraction profile is comprised of their attraction targets, how they feel about these attractions, how often their attractions have shifted, and other such aspects of

attraction. These plots allowed for an examination of the between-individual similarity of each of these factors on a profile level, and clusters represent patterns of similarity within each factor. In other words, individuals who are clustered together are more similar to each other than to individuals in other clusters. To accomplish this, we constructed a 3-D plot of each complete profile, because an individual's full profile is a holistic representation of how they engage in the romantic and sexual realms of their lives. In this way, a cluster represents individuals whose overall romantic and sexual orientations are similar along all measured dimensions. We identified observed clusters via repeated trials, and data points were color-coded based upon cluster membership for visual identification. Each data point can only belong to a single cluster.

As the present study is concerned with exploring both the component factors of individual variation within romantic orientation as well as the pattern of similarities in attraction, behavior, and identity across orientations, the observed clusters from the complete profile (approach clusters) were the most salient differences between individuals. These clusters are of most interest as they represent a combined profile of participants' romantic and sexual attraction, behaviors, and identities. To this end, we retained the identification scheme throughout the rest of the analyses, meaning that for an individual whose complete profile was part of the "green" cluster, their other three profiles (attraction, behavior, and identity) were also colored green. Clusters that emerged from the complete profiles can be examined descriptively; however, the nature of tSNE analysis prevents direct comparison via many other methods.

Complete Profile Interpretation

The 3-D plot of the tSNE results for participants' complete profiles indicates five clusters (Figure 1). That is, there is evidence to support the existence of five general approaches of engaging in romance and sex among our participants. As these profiles are comprised of all responses, they each encompass a relatively holistic representation of an individual's romantic and sexual orientations. Descriptive examination of these approach clusters allows us to better understand which participants were grouped together by the tSNE analysis. Due to the non-deterministic nature of tSNE, descriptive information for the initial plot cannot be directly compared to subsequent plots. As each cluster indicates a different approach, descriptive labels are provided that seek to represent the general approach of the individuals within each cluster. Table 2 presents selected demographics for each cluster. Figures 3, 4, 5, and 6 present selected responses and their associated proportion of total responses separated by cluster.

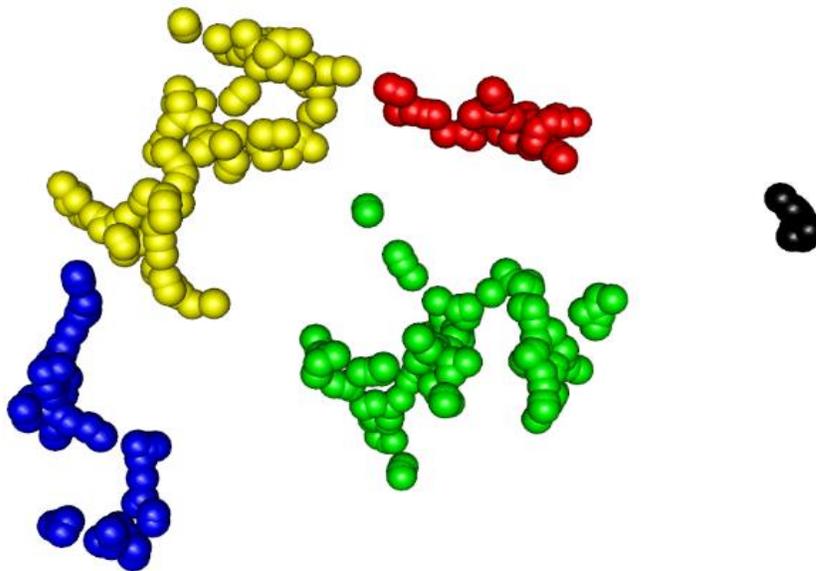


Figure 1. Complete profile plot of tSNE results

Table 2

Selected Demographic Information for Clusters

Demographic Variable	Response	Cluster				
		Black (n=10)	Red (n=36)	Green (n=107)	Blue (n=51)	Yellow (n=102)
Gender % (N)	Female	40% (4)	53% (19)	63% (67)	59% (30)	64% (65)
	Male	30% (3)	19% (7)	15% (16)	10% (5)	17% (17)
	Non-Binary	30% (3)	17% (6)	10% (11)	20% (10)	11% (11)
	Self-described	--	11% (4)	10% (11)	12% (6)	8% (8)
	Did not disclose	--	--	2% (2)	--	1% (1)
Romantic Orientation % (N)	Aromantic	10% (1)	31% (11)	31% (33)	39% (20)	37% (38)
	Heteroromantic	20% (2)	19% (7)	20% (21)	24% (12)	22% (22)
	Homoromantic	10% (1)	3% (1)	9% (10)	10% (5)	2% (2)
	Gray-romantic	30% (3)	33% (12)	19% (20)	22% (11)	16% (16)
	Panromantic	30% (3)	33% (12)	22% (24)	14% (7)	23% (23)
	WTFromantic	10% (1)	14% (5)	17% (18)	10% (5)	8% (8)
	Biromantic	20% (2)	22% (8)	20% (21)	20% (10)	19% (19)
	Lith/Akoiromantic	--	3% (1)	4% (4)	4% (2)	4% (4)
	Demiromantic	40% (4)	11% (4)	26% (28)	14% (7)	17% (17)
	2 choices	30% (3)	17% (6)	22% (23)	18% (9)	22% (22)
	3 choices	10% (1)	3% (1)	4% (4)	2% (1)	1% (1)
	>3 choices	--	--	4% (4)	2% (1)	--
	Did not disclose	20% (2)	--	--	2% (1)	1% (1)

Table 2 (continued)

Demographic Variable	Response	Cluster				
		Black (n=10)	Red (n=36)	Green (n=107)	Blue (n=51)	Yellow (n=102)
Relationship Status % (N)	Single and not looking	50% (5)	47% (17)	53% (57)	57% (29)	56% (57)
	Single and dating / looking	40% (4)	33% (12)	22% (24)	24% (12)	18% (18)
	Non-committed / Casual relationship	--	--	1% (1)	2% (1)	1% (1)
	Committed relationship	--	11% (4)	8% (8)	2% (1)	11% (11)
	Engaged to be married	--	--	1% (1)	--	1% (1)
	Partnered / Married	--	--	2% (2)	4% (2)	3% (3)
	Queer Platonic Relationship	--	6% (2)	4% (4)	8% (4)	5% (5)
	Other	10% (1)	3% (1)	9% (10)	4% (2)	6% (6)
Desire to Engage in Romance % (N)	Don't experience romantic attraction/desire	--	28% (10)	26% (28)	33% (17)	33% (34)
	Don't want or need to engage	10% (3)	31% (11)	30% (32)	35% (18)	38% (39)
	Would engage for partner, but doesn't seek it	10% (3)	31% (11)	34% (36)	28% (14)	27% (27)
	Desires but does not engage	30% (3)	42% (15)	33% (35)	22% (11)	29% (30)
	Only desires if strong emotional connection	70% (7)	31% (11)	44% (47)	37% (19)	37% (38)
	Desires non-romantic relationship	60% (6)	42% (15)	47% (50)	43% (22)	48% (49)
	Other	10% (1)	17% (6)	20% (21)	14% (7)	12% (12)
	Multiple responses	70% (7)	56% (20)	74% (79)	67% (34)	75% (76)
Did not disclose	--	--	4% (4)	4% (2)	7% (7)	

Table 2 (continued)

Demographic Variable	Response	Cluster				
		Black (n=10)	Red (n=36)	Green (n=107)	Blue (n=51)	Yellow (n=102)
Desire to Engage in Sexual Activity (SA) % (N)	Don't experience sexual attraction or arousal	30% (3)	47% (17)	47% (50)	43% (22)	49% (50)
	Don't want or need to engage	60% (6)	67% (24)	79% (84)	73% (37)	72% (73)
	Would engage for partner, but doesn't seek it	60% (6)	36% (13)	37% (40)	26% (13)	36% (37)
	Doesn't want with partner, uses masturbation	50% (5)	42% (15)	44% (47)	45% (23)	45% (46)
	Feels neutral toward sex, doesn't need it	30% (3)	33% (12)	21% (22)	24% (12)	21% (21)
	Desires and enjoys sex, but doesn't need it	10% (1)	6% (2)	3% (3)	2% (1)	8% (8)
	Only with a strong emotional connection	40% (4)	8% (3)	11% (12)	12% (6)	12% (12)
	Other	10% (1)	14% (5)	16% (17)	12% (6)	8% (8)
Change in Romantic Attraction % (N)	No	60% (6)	61% (22)	63% (67)	73% (37)	66% (67)
	Yes - once	20% (2)	39% (14)	22% (23)	14% (7)	8% (8)
	Yes- more than once	20% (2)	--	16% (17)	14% (7)	27% (27)
Change in Sexual Attraction % (N)	No	60% (6)	72% (26)	78% (83)	80% (41)	72% (73)
	Yes - once	30% (3)	28% (10)	17% (18)	10% (5)	13% (13)
	Yes- more than once	--	--	6% (6)	10% (5)	13% (13)

Note: Percentages sum to more than 100%, multiple responses were possible for many of the items and all responses are displayed separately here. As the clusters were of various sizes, percentages are presented before the associated number of participants for each item. This is to allow for easier interpretation across clusters

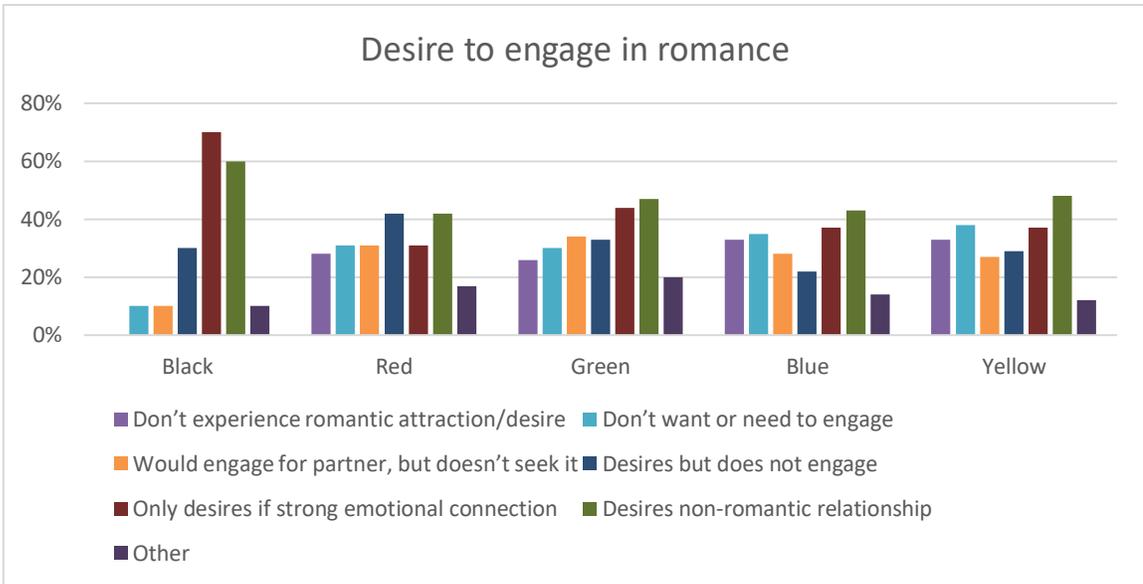


Figure 2. Desire to engage in romance by cluster and percentage of total responses

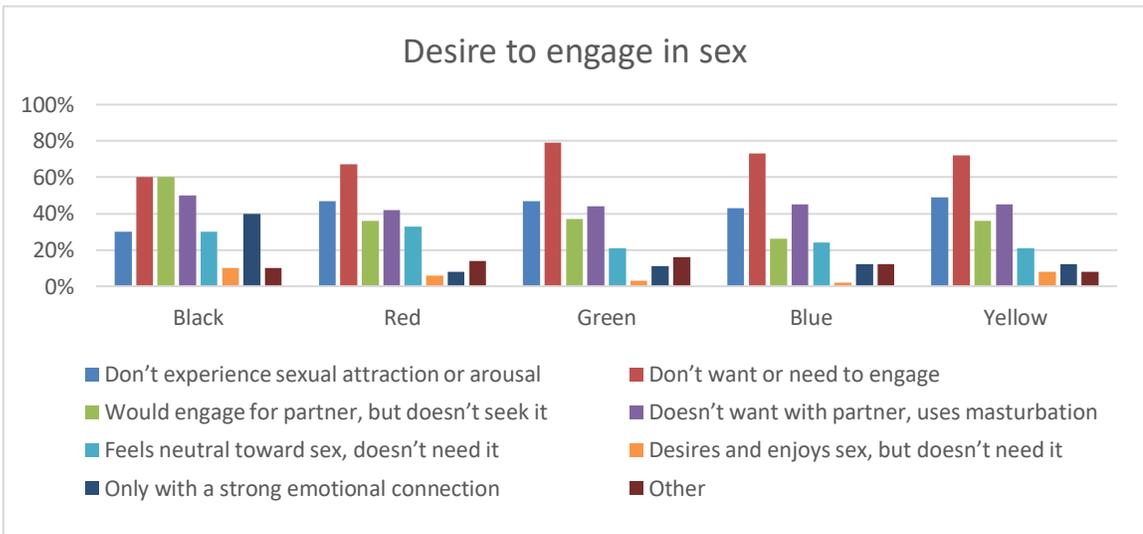


Figure 3. Desire to engage in sex by cluster and percentage of total responses

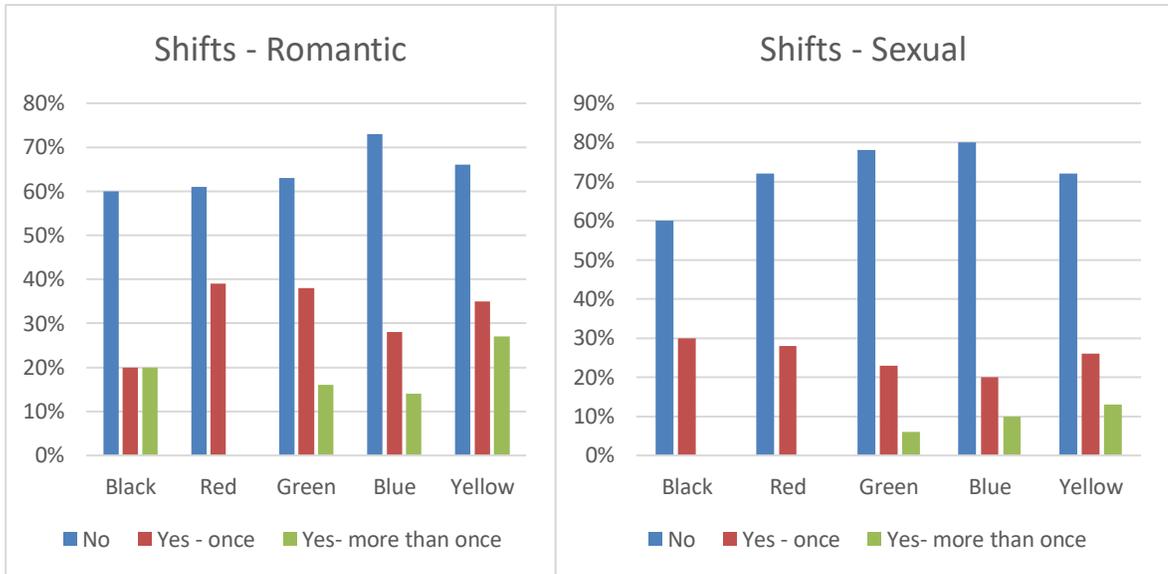


Figure 4. Number of shifts in romantic and sexual attractions by cluster.

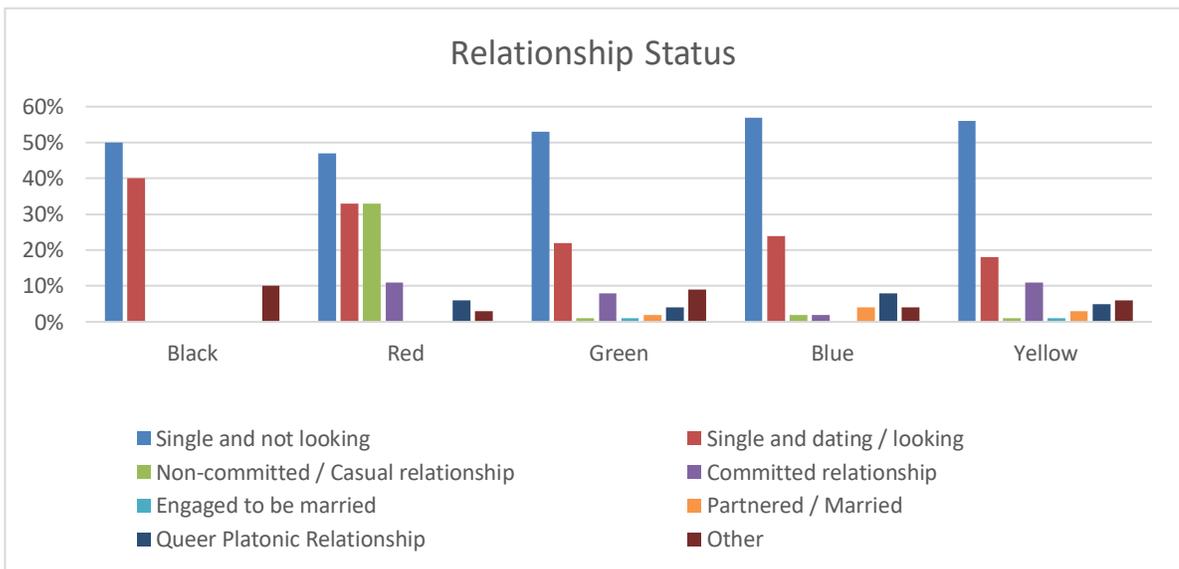


Figure 5. Relationship status by cluster.

The cluster indicated by black points contains 10 total participant profiles. Overall, individuals in this cluster are mostly single, all experience romantic attraction or desire, desire to engage in romantic and/or sexual relationships dependent upon specific contextual factors and have relative stability within romantic and sexual orientations. In other words, persons within this cluster want to be in a romantic or sexual relationship with others in some specific circumstances, and generally have not experienced shifts in their orientations (figure 4.) Additionally, 40% of individuals in this cluster desire sexual activity with others in the presence of a strong emotional connection (figure 3.) This cluster is the “low-fluidity context-dependent relationship cluster.”

The cluster represented by red points is comprised of 36 individuals who identify using a wide variety of romantic orientations and generally have experienced either zero (61%) or one (39%) shift in romantic attraction over time (figure 4.) Their romantic orientation is also typically conveyed in a single label (80%). Similarly, these individuals have also experienced zero (72%) or one (28) change in their sexual attractions as well. Some (28%) of these individuals do not experience romantic attraction or desire, and nearly a third (31%) engage in romantic relationships only for their partner’s sake (figure 2.) Conversely, many (42%) desire romance, but do not engage in romantic behaviors or relationships. That is, persons in this cluster generally identify within a single romantic orientation which has not changed during their lives, and either engage in romance when their partner desires it, or desire romance themselves but do not engage in it. This cluster is referred to as the “partner-influenced single-label cluster.”

The cluster indicated by green points contains 107 participants. Individuals in this cluster displayed a wide diversity of responses in all categories, nearly a third (30%) had two or more responses for their romantic orientation, and every relationship status listed in the survey was endorsed by at least one individual (figure 5.) Additionally, a portion of participants self-described their romantic (20%) desires and sexual (16%) desires, rather than using the established labels (see figures 2 and 3.) Participants within this cluster rarely ascribed to a single label across all dimensions. Essentially, people within this cluster use multiple descriptive labels to communicate their orientations and desires. This cluster is the “identity-communication cluster”.

The 51 individuals in the cluster with blue points are largely single, and 8% are involved in queer platonic relationships. Many (39%) participants self-described as Aromantic and reported high rates of not experiencing romantic attraction (33%) or not wanting to engage in romance (35%). These individuals also endorsed a low rate (26%) of willingness to engage in sexual activity with their partner and low rate (2%) of desiring/enjoying sex (figure 3.) This cluster also has a low rate of fluidity in romantic (27%) and sexual (20%) orientations (figure 4.) In other words, individuals in this cluster (the “stable non-romantic cluster”) generally do not experience romantic attraction or shifts in their orientations and do not engage in romantic or sexual behaviors.

The cluster of yellow points is made up of 102 participants who largely do not experience romantic attraction (33%) or do not desire to engage in romance (38%) (See figure 2.) A large proportion (48%) of these individuals also desire a non-romantic relationship and a relatively low percentage (27%) are willing to engage in romance for

their partner's sake alone. Almost half (49%) of these individuals do not experience sexual arousal or attraction, although more than a third (36%) would engage in sexual activity for their partner. Nearly half (45%) of the individuals within this cluster engage in masturbation for the purpose of sexual satisfaction, while some (21%) feel neutral toward sex (See figure 3.) Additionally, some individuals within this cluster have experienced multiple shifts in their romantic (27%) and sexual (13%) attraction (figure 4.) Essentially, people within this cluster do not experience romantic attraction, either engage in sexual behaviors for their partner's sake or masturbate and have experienced a high level of fluidity in their orientations. This is referred to as the "fluid non-romantic cluster."

Factor Profile Interpretation

Next, we constructed 3-D plots of each factor profile, one plot for attraction, one for behavior, and one for identity. Each individual plot contains only participant profiles made solely of responses to items directly related to that specific factor. In other words, an individual's "attraction" profile only includes responses to items that are about attraction. We believed that each factor plot would have distinct structural characteristics and clusters from each other, which the consistent color-coding helps to visualize.

Attraction. The plot for attraction (Figure 6) includes 10-12 discrete clusters. Many of the clusters are comprised of individuals from one or two approach clusters which represents patterns of romantic and sexual attraction that are in many ways similar to the overall approach in which individuals engage (or choose not to engage) in romantic and sexual activities. Additionally, it is important to note the small black point dominated

and the predominantly green point clusters within the Attraction plot. This suggests that individuals who are part of those clusters on their complete profile engage in romantic and sexual attraction in a way that is distinct from others. For example, individuals within the low-fluidity context-dependent (black) cluster typically engage in sexual and romantic activity based upon situational factors, so their pattern of attraction may be more closely linked with context than individuals within other clusters.

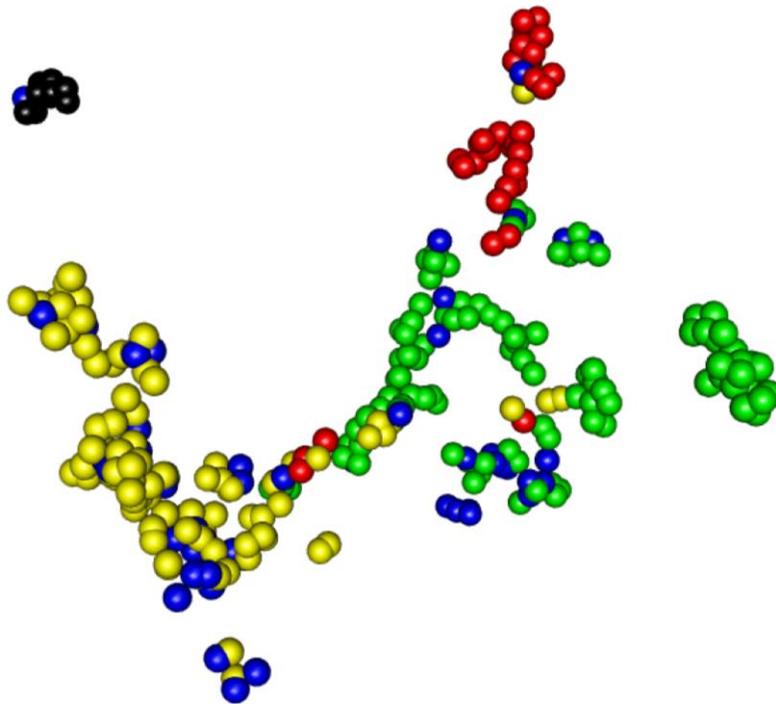


Figure 6. Attraction plot of tSNE results

Behavior. The behavior plot (Figure 7) contains of a large number of clusters, many of which are relatively small. There is also a noticeable combination of different color points within each cluster; there are no clusters that are comprised solely of individuals with the same approach. Additionally, there is considerable spread between clusters and a high level of dispersion in the clusters which have formed, indicating high levels of variability. That is, behaviors appear to be less linked to an individual's overall approach to romance or sex. Additionally, it seems that there is diversity within behavioral patterns, meaning that context may be the most salient consideration to choosing to engage in specific behaviors.

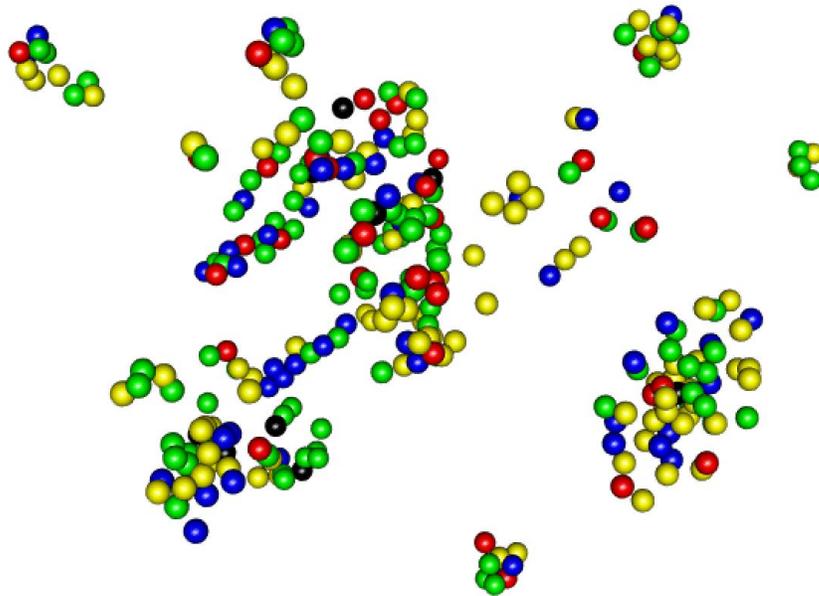


Figure 7. Behavior plot of tSNE results

Identity. There are 8-10 clusters present within the identity plot (Figure 8). Aside from a single stable non-romantic (blue) dominated cluster, there is also a large number of different approaches within each cluster. The clusters in the identity plot are also relatively compact, indicating elevated similarity within each cluster at a local level. In contrast to this, these clusters have very few data points between them, indicating distinct patterns of difference between clusters. In other words, different identities may have some conceptual overlap but are largely distinct, and do not cleanly map onto the ways in which individuals navigate romance or sex.

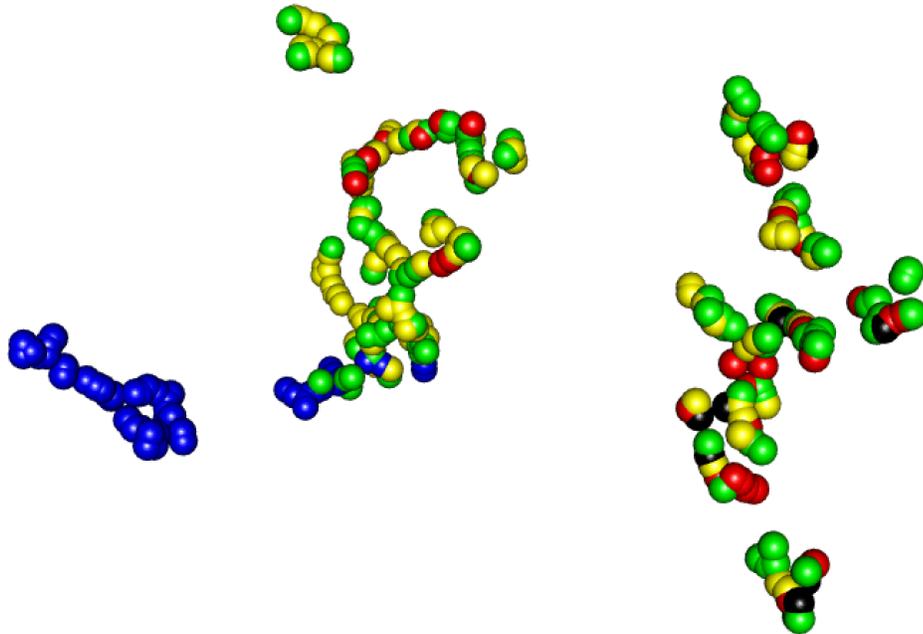


Figure 8. Identity plot of tSNE results

Chapter 4

Discussion

Taken together, our results suggest that the individual factors of attraction, behavior, and identity have a complex and nuanced relationship with a person's overall romantic and sexual orientations. Clusters within the factor plots are composed of individuals with different approaches, as indicated by the scatter of different colors. This suggests that an individual's approach to engaging in romance or sex does not map cleanly onto a single factor, as each factor plot had clusters of various approaches. For example, as can be seen in Figure 7, each cluster includes people with different approaches that have similar behavioral profiles, for example individuals from several approaches who dislike engaging in sexual behaviors such as penetrative intercourse but desire to engage in romantic behaviors such as holding hand and cuddling. Although the tSNE analytic technique and the current study were exploratory in nature, the results support the growing literature suggesting that contemporary conceptualizations of sexual and romantic orientation fail to fully capture individual experiences. In addition to the specific conclusions that can be drawn about the characteristics of our sample, this study can provide a better understanding of romantic and sexual orientation from a more general perspective. Specifically, the patterns that were examined in this study point to important components of sexual and romantic orientations that may be being missed through current conceptualizations. Examination of cluster characteristics can lead to a deeper understanding of both this sample and in generation of future hypotheses.

Further, the structure of the attraction plot (Figure 6) suggests that patterns of attraction are a major factor in how an individual navigates the romantic and sexual realms of their lives. It is likely that this is in large part because traditional identity labels have typically been tied to attraction through both self and partner identities, a fact that leaves many individuals unable to accurately self-label their orientations (Diamond & Butterworth, 2008; Galupo et al., 2016). Since the gender and sex of self and partner have traditionally served as a primary factor in determining one's orientation label, the similarities between the attraction and overall plots fit with this perspective. It is interesting that individuals in the blue cluster (characterized by low desire to engage in romance and sexual activity) are distributed throughout otherwise single-color clusters. This may be due to their ambivalent responses regarding attractions generally, whichever aspects of attraction they do experience may be similar to individuals from other clusters without strongly dissimilar competing attractions. It is possible that more specific items which more clearly delineate desire to engage in romance or sexual activity from attractions may help to disentangle this more.

Some of the results in this study are surprising. One such result is the behavioral profile plot, wherein the amount of difference between individuals seems to be far greater than the amount of similarity. This may be due to how individuals view behaviors themselves outside of engaging in the behavior with a partner. For example, a person's feelings towards the act of oral sex itself would influence their response to desiring to engage in oral sex with a romantic partner. The inclusion of situational responses added further complexity to behaviors, which likely played a role in the resulting many-

clustered high dispersion plot. Overall, the behavior plot (Figure 7) represents an incredible diversity of behaviors and motivations for engaging in these behaviors. There has been much attention paid to motivations for sexual behaviors, but significantly less attention has been given to the role of situational factors and motivations for romantic behavior (O'Sullivan & Gaines, 1998; Peterson & Muehlenhard, 2007). Further examination of these situational factors would strengthen our understanding of motivations for behaviors.

The identity plot (Figure 8) displays high levels of approach variety in all clusters, with the exception of a single stable non-romantic (blue) cluster. There is a significant disconnect between orientation and identity and this population is attuned to a number of nuanced identity labels. This plot seems to represent the extent to which contemporary identities fail to capture the experiences of individuals, an issue which has begun to receive focused attention (Galupo et al., 2016; Schudson et al., 2017; van Anders, 2015).

The analysis of this data includes a number of critical decision points, and attempts have been made to include all of these decisions and accompanying rationales within this manuscript. One such decision is to assign participants a color based upon their overall profile's cluster membership. Due to the non-deterministic and fundamentally exploratory nature of tSNE, these clusters would be slightly different each instance. Suggested implementation of tSNE includes plotting multiple instances with varying hyperparameters and assessing which combination of hyperparameters produces the most easily interpretable plot (van der Maaten & Hinton, 2008). Similar to many qualitative methods, this procedure includes a level of subjective decision making on

behalf of the researcher. That is, the cluster membership could be slightly different if we used a different plot to represent the data. However, we chose the current plot given the clear separation between clusters and the ease of interpretation, as suggested by previous researchers (van der Maaten & Hinton, 2008). The few data points that were between clusters were assigned to the closest cluster (determined by replotting with larger point diameters until overlap). Maintaining this identification scheme throughout subsequent plots allows for examination of the factors which lead to these individual's overall manner in navigation of the romantic and sexual realms of their lives.

Despite the novel information gained from these analyses, this study is not without limitations. As our participants were recruited from regional listservs and a website, they may not be representative of asexual individuals as a whole. However, as existing national or global surveys of asexual-identifying individuals use varying definitions of asexuality (and therefore different populations), there is little data suggesting which characteristics are truly representative of the general asexual population (Bogaert, 2004; Brotto et al., 2015; Poston & Baumle, 2010; Prause & Graham, 2007). As samples of participants drawn from listservs or websites must necessarily have access to the internet, a gap in access may have prevented some individuals in our population of interest from being represented by the current sample. While this is potentially true, current estimates of asexuality prevalence are 1% of the population, and thus recruitment via websites and listservs to which members of this population already frequent allowed for the resulting sample size. Additionally, participants predominantly identified their gender as female, and current literature supports higher rates of asexuality in women, so

our sample seems to be representative with regard to gender (Bogaert, 2006; Prause & Graham, 2007). The racial and ethnic demographics of our survey participants, in addition to the survey only being offered in English, also present limitations from an intersectional perspective, although the racial and ethnic composition of our sample is generally consistent with previous studies with asexual individuals, although we do not have a strong sense of the racial, ethnic, or linguistic composition of the global asexual population (Bogaert, 2004).

Future studies on romantic and sexual orientation should closely assess situational variables associated with identity, attraction, and behavior. As many of our survey items included space for participants to add comments and their own descriptions, many participants provided a wealth of qualitative data which will be utilized in future iterations of both our items and overall survey structure. Participants identified that additional questions asking about specific contextual factors which could change an individual's desire or willingness to engage in specific behaviors or endorse attraction and identity descriptors may have altered their responses. For example, items regarding behaviors had several situational variations, but did not always allow for combinations of situations such as willingness to engage in sexual activity with someone following a deep emotional connection AND for the partner's sake alone. While the current study explored the role of each of these factors in an individual's general approach to romance and sexuality, more specific inquiry (incorporating community feedback) needs to examine what underlies engagement approaches within the factors themselves. Through utilization of the common characteristics within each cluster (such as high or low fluidity, many or

few orientation labels and others) future focused inquiry into the components of these factors could lead to better understanding of orientations as a whole.

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