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Sexual Orientation Trajectories Based on Sexual Attractions, Partners, and Identity: A Longitudinal Investigation From Adolescence Through Young Adulthood Using a U.S. Representative Sample

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Defining sexual minority status longitudinally over critical developmental periods is essential for understanding the roots of health disparities. Theory supports multidimensional continuums, but current research often examines single measures of sexual activity, sexual attractions, or self-labeled identity separately. Here, a new typology of longitudinal latent classes describes dynamic multidimensional processes continuing from late adolescence (ages 16 to 18) through the late 20s. Using Add Health data (N = 6,864), longitudinal latent class analysis (LLCA), a person-centered approach, showed significant differences between the orientation experiences of males and females (invariance tests led to stratification by sex). The male LLCA model predicted four classes: straight males (87.4%), minimal sexual expression males (6.5%), mostly straight and bi males (3.8%), and emerging gay males (2.4%). The female LLCA model predicted five classes: straight females (73.8%), minimal sexual expression females (7%), mostly straight discontinuous females (10.2%), emerging bi females (7.5%), and emerging lesbian females (1.5%). Some classes represent generally consistent indicators across dimensions over time, while other classes describe more emerging or discontinuous trajectories. Substantial changes were common not only from late adolescence to the early 20s but also from the early 20s to the late 20s, indicating that sexual orientation development continues throughout emerging adulthood.

The most critical barrier to addressing health and well-being disparities for sexual minority groups is the lack of consensus and quality in gathering, operationalizing, and analyzing data about this heterogeneous community. This is especially important for critical developmental periods, such as adolescence and young adulthood, when sexual orientation is often in the process of being established and many disparities begin to emerge (Charlton et al., 2018; Institute of Medicine, 2011; Katz-Wise et al., 2017; Russell, 2016; Saewyc, 2011; Savin-Williams, 2008). As discussed in the sections that follow, sexual orientation paradigms that are unidimensional, that are not on a continuum, that are static, or that assume identical male and female experiences may create limitations in research among sexual minority young people.

Multidimensional Approaches

Improvements in our theoretical and empirical understandings of sexual orientation support a multidimensional paradigm that simultaneously integrates measures of sexual attractions and sexual relationship behavior and sexual identity (Diamond, 2000, 2016; Kaestle & Waller, 2011; Saewyc, 2011; Saewyc et al., 2004; Savin-Williams & Ream, 2007). However, when data on sexual orientation are collected in large-scale surveys, they often use only a single measure of either sexual attractions, sexual relationship behavior, or sexual identity (Kaestle & Ivory, 2012; Kaestle & Lyons, 2016; Korchmaros, Powell, & Stevens, 2013; Saewyc, 2011; Saewyc et al., 2004; Savin-Williams & Ream, 2007). These measures are sometimes only weakly associated, especially in adolescence, and each one can lead to serious misclassification bias when used alone (Diamond, 2000; Friedman et al., 2004; Kaestle & Lyons, 2016; Poteat, Russell, & Dewaele, 2017; Russell, Clarke, & Clary, 2009; Saewyc, 2011; Savin-Williams & Ream, 2007; Sexual Minority Assessment Research Team, 2009). However, even when data on multiple indicators of sexual orientation are gathered, researchers may experience confusion about how

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to effectively integrate data on attraction, behavior, and identity for analyses (Saewyc, 2011). How does one avoid simply modeling each indicator separately by integrating the measures in a way that still distinguishes the unique qualities of each dimension? Fundamentally, novel typologies are needed to incorporate multiple dimensions creatively to improve the validity of orientation measurement. One promising option explored in the current study is to take advantage of advances in understanding person-centered (versus variable-centered) statistics.

Sexual Orientation Continuums

Evidence indicates that sexual orientation is not dichotomous (e.g., straight or gay) but is experienced along a continuum with many gradations and in-between experiences (Savin-Williams, 2014, 2016; Vrangalova & Savin-Williams, 2012). Distinguishing among sexual minority subgroups is often made difficult because researchers tend to place sexual minority populations together (Kaestle & Ivory, 2012; Savin-Williams, 2017; Sexual Minority Assessment Research Team, 2009). For example, respondents with bisexual or mostly heterosexual indicators may be grouped with respondents who are gay or lesbian into a general sexual minority group to increase sample size, to simplify analyses, or because of the assumption that bisexuality is just a transitional phase (Kaestle & Ivory, 2012; Russell, 2011; Russell & Seif, 2002; Savin-Williams, 2016, 2017). There is no consensus on the appropriate number of groupings for analyses, but methods that inappropriately aggregate or misidentify groupings further cloud the picture with respect to sexual minority health patterns so that the unique and specific health needs of subgroups cannot be determined (Kaestle & Ivory, 2012; Kaestle & Lyons, 2016; Kuyper & Bos, 2016; Saewyc, 2011; Savin-Williams & Vrangalova, 2013). Of course, researchers will always struggle with imposing categorical language onto sexual orientation because of its inherent nature as a combination of multidimensional continuums (Savin-Williams, 2016). The persisting biases in society and resulting disparities in health and well-being must be surveilled and tracked to shape change and assess progress. The current analyses and the resulting typology, therefore, are an attempt to balance those needs while recognizing the inherent complexities of summarizing information on orientation.

Fluidity, Development, and Change in Adolescence and Young Adulthood

Improvements in our theoretical understandings of sexual identity development also support a paradigm that is potentially fluid (Brogan, Frank, Elon, & O'Hanlan, 2001; Diamond, 2003, 2005, 2008; Diamond, Dickenson, & Blair, 2017; Diamond & Rosky, 2016, 2016; Katz-Wise, 2015; Katz-Wise & Hyde, 2015; Rosario, Schrimshaw, Hunter, & Braun, 2006; Savin-Williams, 2009, 2017). The term *fluidity* refers to a flexibility in sexual responsiveness depending on situations such as relationships or larger social and cultural

contexts (Diamond, 2016); fluidity in sexual orientation may be a response to changing situations throughout the life course and is not specific to any set age range.

However, large transitions in the life course, such as adolescence and young adulthood, also introduce developmental explorations of feelings, behaviors, and identity that may involve questioning and experimentation across various continuous dimensions of sexual orientation. Establishing sexual identity is a major developmental task of adolescence. In addition, some teenagers may not have had sexual relationships or experienced many attractions yet. All of these factors could contribute to a greater likelihood of measure disagreement during adolescence (Cohler & Hammack, 2007; Friedman et al., 2004; Russell et al., 2009; Saewyc, 2011; Saewyc et al., 2004; Savin-Williams, 2009; Sexual Minority Assessment Research Team, 2009). Long-standing social forces such as homophobia may play a role in delaying these developmental tasks and experiences, while more recent changes in the social landscape may create an environment more conducive to earlier timing of such experiences.

Research on sexual minority populations has largely focused on adults in cross-sectional studies (Institute of Medicine, 2011), making it difficult to explore implications of temporal issues such as early developmental trajectories of sexual minority indicators, the timing of transitions in the life course, and the potential disagreement or shifts along sexual orientation dimensions during the critical period of adolescence and young adulthood. More life-course-informed research is needed to better understand how early attraction and behavior map onto later sexual orientation identities and health disparities. Therefore, the objective of the current study was to define sexual minority status longitudinally over critical developmental periods using multidimensional continuums.

Differences in Male and Female Trajectories?

Sensitivity is growing in the literature regarding potential differences in the sexual orientation experiences of males and females. Specifically, trajectories through orientation milestones, reports of both-sex attractions, experiences with sexual identity fluidity, and the capacity to experience change in sexual responsiveness may vary by sex, but the extent and direction of the relationship is under debate (Baumeister, 2000; Diamond, 2008, 2012; Diamond et al., 2017, 2016; Katz-Wise, 2015; Katz-Wise & Hyde, 2015; Peplau, 2003; Rosario et al., 2006; Savin-Williams & Diamond, 2000; Savin-Williams & Ream, 2007; Tolman & McClelland, 2011). Researchers have theorized several potential reasons for differences—including essentialist biological and evolutionary arguments employing genetics and hormones, as well as sociocultural explanations focusing on sensitivity to context—in the potential consequences of sexual contact for women that are dependent on relational situations and on the relative control of men and women in

society at large and over sexual interactions in particular (Baumeister, 2000; Rosario & Schrimshaw, 2014). New typologies for sexual orientation must address the intersectionality of a person's sex and sexual orientation in shaping sexual minority experiences. Male and female trajectories should be directly compared to assess how robust typologies are across sex, as this affects the interpretability, validity, and usefulness of measures.

Current Project

This secondary analysis used data from the National Longitudinal Study of Adolescent to Adult Health (Add Health)—one of the first nationally representative longitudinal studies to measure orientation (Sexual Minority Assessment Research Team, 2009)—to develop and describe a typology of sexual minority status from adolescence through young adulthood. Add Health data provide detailed information on multiple dimensions of sexual orientation that can be linked to the age of the respondent over time. I combine these data to support the person-centered identification of subgroup types who share similar experiences as they grow older. Because of Add Health's size and sampling design, the data are representative of the nation and are generalizable.

In this study, I take advantage of person-centered statistical techniques to synthesize and refine typologies that identify classes (subgroups) characterized by unique multidimensional and time-varying patterns of sexual minority status indicators. Person-centered techniques can create typologies that identify key patterns across variables in a holistic way, accounting for the high-level interactions that characterize development (Bauer & Shanahan, 2007; Bergman, 1998). Specifically, this research addressed the following questions: (1) Are there typologies of underlying classes or types of longitudinal sexual orientation indicator patterns that represent the heterogeneity of sexual orientation experiences across adolescence into adulthood? (2) Do females and males have the same class structure for sexual orientation experiences over time (i.e., is the typology measurement invariant across sex)?

Method

Sample

These analyses used the contractual data sets of Waves I through IV of the Add Health study. More than 20,000 Wave I in-home interviews were completed in 1995 with a 79% response rate (ages ranged from 11 to 21). Because Wave II one year later did not include those who graduated from high school, the data from that wave were not included in the present analyses. At Wave III, all previous respondents (including those in the 12th grade at Wave I) were targeted between August 2001 and April 2002 ($N = 15,197$, ages 18 to 26). Respondents were reinterviewed for Wave

IV between January 2008 and February 2009 ($N = 15,701$, ages 24 to 32). The current analyses were limited to respondents who had longitudinal weights for participating in Waves I, III, and IV ($N = 12,288$). Analyses of nonresponse effects across waves of Add Health indicate that the impacts on estimates of several health and risk-related outcomes are small in scale and mostly statistically nonsignificant (Brownstein et al., 2011).

Preliminary analyses indicated that including early adolescents in the study sample resulted in classes that fractured the group of straight respondents into artificial subgroups. These subgroups initially appeared to separate later and earlier sexual debut experiences, but in reality they just reflected differences in age cohorts. With little variance in Wave I responses, stratifying by age and examining early adolescents separately resulted in small numbers of classes (e.g., two classes) that were too broad to interpret meaningfully. Therefore, to restrict the study to a more homogeneous group, and because the low levels of sexual experiences and attractions in early adolescence stabilize more at higher levels by age 16, I selected a narrow age range of those 16 to 18 years at Wave I (rounded to nearest integer) for the current study, leaving $N = 6,928$. While this allowed for interpretable analyses, it also restricted potential understandings of development in earlier adolescence.

Last, I further limited the study sample to those who gave valid responses to sexual identity questions in Waves III and IV, for a final study sample of $N = 6,864$. Data for this final study sample of 6,864 respondents represent three time points in the life course: when they were in their late teens (Wave I, restricted to ages 16 to 18), in their early 20s (Wave III), and in their late 20s to early 30s (Wave IV).

Measures

Important indicators of sexual minority classes include self-labeling, sexual relationship behavior, and attraction measures to represent distinct dimensions of sexual orientation (Saewyc, 2011; Saewyc et al., 2004). Add Health evaluated these dimensions of sexual orientation at multiple time points. Respondents reported their own sex (gender identity was not explored explicitly, and no respondents in this subsample changed their report of sex over the time points). Each was also asked about his or her romantic attraction to males and to females at every wave, allowing me to create a four-category variable of romantic attractions (*Other sex only*, *Same sex only*, *Both same and other sex*, and *No attractions reported*) for Waves I, III, and IV. At all waves, respondents were also asked to report on their romantic and sexual relationships occurring in the past year or since the last interview and the sex of the partner, allowing me to create a four-category sexual relationships variable (*Other sex only*, *Same sex only*, *Both same and other sex*, and *No relationships reported*) for Waves I, III, and IV. At Waves III and IV only, sexual identity self-labels were captured by a new item, "Please choose the

description that best fits how you think about yourself,” with six possible options to choose from (“100% heterosexual,” “Mostly heterosexual,” “Bisexual,” “Mostly homosexual,” “100% homosexual,” and *Not sexually attracted to either sex*). In this article I use these terms in quotations to accurately indicate the options respondents were given to express their sexual identity in the Add Health surveys. However, because of the history of the use of the word *homosexual* to indicate negative clinical implications and its focus on only behavioral components of sexual orientation, I use alternative terms, such as *gay* and *lesbian*, in my discussions of orientation patterns.

In the current study, I analyzed data from the two four-category variables (for attractions and relationships) from three time points (teens, early 20s, late 20s), and the six-category variable (for self-labels) from two time points (early 20s, late 20s) as described. This resulted in eight indicators of orientation and $4^6 \times 6^2 = 147,456$ different possible answer patterns of sexual orientation experiences over time.

Analyses

The study goal was to explore operationalization techniques to develop a typology (classification system) that approaches sexual minority status as a nuanced, person-centered, multidimensional, time-varying construct to capture age-sensitive transitions and trajectories in attraction, relationship behavior, and self-labeled identity. Specifically, I used repeated-measures or longitudinal latent class analysis (LLCA), which is a person-centered approach that uses indicators at multiple time points to measure class membership (Lanza & Collins, 2006). Such holistic, person-centered strategies implicitly incorporate high-level interactions and non-linear relationships while simultaneously maintaining a parsimonious model (Bergman, 1998). LLCA accommodates categorical variables and, unlike latent transition analysis (LTA), can follow three or more time points and does not require that all measures are repeated at all time points (Collins & Lanza, 2013). This allowed me to include self-label data even though these data were not collected at Wave I. LLCA is also particularly good at detecting subtle and discontinuous developmental periods, such as those who have periods of increase and then decrease in various orientation indicators through their development (Lanza & Collins, 2006). Classes group individuals with similar response patterns over time (Lanza & Collins, 2006), resulting in a typology with subgroups characterized by unique multidimensional and time-varying patterns of indicators.

To explore potential LLCA models of sexual orientation development from the teens to the early 20s through the late 20s, I used the PROC LCA command in SAS based on the eight indicators of orientation described in the Measures section, and I incorporated elements of Add Health’s complex sampling design in the analysis (Lanza, Dziak, Huang, Wagner, & Collins, 2014). Because there is little agreement

in the literature as to the number or nature of orientation categories, no specific number of classes was hypothesized. Rather, determining the optimal number of classes in LLCA requires the testing of several class solutions (e.g., two-class, three-class, four-class, five-class, six-class, seven-class, and eight-class models), then homing in on and determining the best-fitting model using several types of indicators in concert as described in the following section (Finch, 2015; Lanza, Collins, Lemmon, & Schafer, 2007; Roesch, Villodas, & Villodas, 2010).

Fit indicators that penalize for both the number of parameters and the sample size include the consistent Akaike information criterion (CAIC), the Bayesian information criterion (BIC), and the adjusted BIC (Akaike, 1974; Bozdogan, 1987; Finch, 2015; Schwarz, 1978; Sclove, 1987). Lower values generally indicate a better fit and parsimony for information criteria statistics (Lanza et al., 2007). The BIC (Nylund, Asparouhov, & Muthén, 2007) and the adjusted BIC in particular (Bauer, 2007; Henson, Reise, & Kim, 2007; Nylund et al., 2007; Roesch et al., 2010; Yang, 2006) perform very well as indicators for class enumeration in simulation studies, especially when indicators are categorical. In addition to information criteria statistics, it can be helpful to consider entropy, which gives an aggregate of posterior probabilities so that higher entropies indicate greater class separation and correct classification (Celeux & Soromenho, 1996; Ramaswamy, DeSarbo, Reibstein, & Robinson, 1993; Roesch et al., 2010). Although bootstrapping approaches such as the bootstrapping likelihood ratio test (BLRT) (Finch, 2015; Nylund et al., 2007) are also favored in class enumeration, they are not available for the polytomous items (more than two response choices) or clustered data structures present in this study (Dziak, Lanza, & Xu, 2011).

In addition to statistical fit indicators, which may be inconsistent, the interpretability of each possible resulting class must be considered in choosing the best number of classes (Finch, 2015; Lanza et al., 2007). Interpretability of conditional response probabilities (the probability that someone in that class would have given a specific response) is examined to determine if each class is distinguishable from others, has meaningful class membership, and can be assigned a meaningful name or label to describe the class (Lanza et al., 2007).

As a respondent’s sex is hypothesized to play an integral role in shaping the experience of sexual orientation, invariance of latent classes by sex was first explored. Multiple-group LLCA (Collins & Lanza, 2013) was used to assess robustness by sex to determine if typologies were equally applicable across males and females (Finch, 2015). The full sample was modeled with free estimation of parameters across groups and then again with parameters restricted across groups, and these two nested models were compared using G^2 difference scores in which a significant p value tests the null hypothesis of measurement invariance (Lanza et al., 2007). Thus, a significant p value indicates that the

meaning of the latent classes may be different for men and women and that group-specific modeling should be employed (Lanza et al., 2007).

Another important step in latent class analysis invariance testing is to assess whether the number of classes is actually the same across males and females (Collins & Lanza, 2013; Finch, 2015). This involves determining the number of latent classes in the sample as a whole and then determining whether the number is the same in each group independently by fitting models to each group separately (Finch, 2015). Therefore, the sample was split by sex (males, $N = 3,209$; females, $N = 3,655$) to determine if the optimal number of classes was the same for each group.

Results

As noted in the Sample section, the models were based on longitudinal data from those who were ages 16 to 18 at Wave I, which put them in their early 20s at Wave III and their late 20s to early 30s at Wave IV. For the entire sample modeled as a whole, the low CAIC, BIC, and adjusted BIC shown in Table 1 favored a five-class model. Using this baseline model, we added the respondent's sex as a grouping variable. To test invariance across sex, we compared a model with parameters estimated freely to one in which parameters were constrained to be equal across males and females using G^2 difference scores. The significant test results indicate that the meaning of the latent classes were different for males and females ($\chi^2(140) = 771.69, p < .001$). The null hypothesis of latent class invariance across multiple groups was not supported (Lanza et al., 2007), so further analyses were stratified by sex to better incorporate and represent intersectionality

Table 1. Fit Statistics for Models of Sexual Orientation Trajectories With Four Through Six Latent Classes for the Full Final Study Sample ($N = 6,864$), for Males Only ($N = 3,209$), and for Females Only ($N = 3,655$)

	BIC	CAIC	Adjusted BIC	Entropy
Full sample				
Four classes	4807.04	4922.04	4441.6	0.88
Five classes	4611.85	4755.85	4154.25	0.89
Six classes	5034.73	5207.73	4484.98	0.69
Males only				
Four classes	2602.54	2717.54	2237.13	0.90
Five classes	2663.49	2807.49	2205.94	0.75
Six classes	2837.51	3010.51	2287.81	0.77
Females only				
Four classes	3731.95	3846.95	3366.53	0.87
Five classes	3533.61	3677.61	3076.05	0.89
Six classes	3684.77	3857.77	3135.07	0.80

Note. Lowest information scores and highest entropy indicated in bold. Results support four male classes and five female classes; BIC = Bayesian information criterion; CAIC = consistent Akaike information criterion.

between orientation and sex in producing typologies of sexual minority status.

It was thus important to establish the ideal number of classes for men and women separately as a further inquiry into invariance across sex (Collins & Lanza, 2013; Finch, 2015). Final decisions on how many classes to include were based on fit indices and interpretability as described in the following text (Lanza & Collins, 2006). The ideal number of classes differed between males and females, providing additional evidence of invariance across groups (Collins & Lanza, 2013; Finch, 2015; Lanza et al., 2007). Separate group modeling and providing group specific interpretations of classes is prudent under these conditions (Lanza et al., 2007).

In the next sections, the resulting classes are presented for the male and female models. As is traditional in latent class style analyses, I have named each class in a way that summarizes my interpretation of the predicted probabilities and pulls together trends in multiple dimensions reported by respondents over time. I have used contemporary terms such as *gay*, *lesbian*, *bi*, and *straight* in the class names to lessen the emphasis on the word *sexual* and to distinguish them from the terms used by the Add Health measure of self-labels (i.e., *heterosexual*, *bisexual*, *homosexual*).

Four-Class Male LLCA Model

For the male subsample models, the low CAIC and BIC and the high entropy shown in Table 1 favored a four-class model. Although the preponderance of fit statistic evidence supported a four-class model, the marginal adjusted BIC results led to a careful examination of the interpretability of the resulting classes. In models with higher numbers of classes, sexual minority groups were not further split or detailed. In the five-class model, the "heterosexual"-identifying population was split into further subgroups that were artifacts of slight variations in age and did not add to interpretability. At four classes, the item-response probabilities predict and define distinguishable and meaningful groups. Based on characteristics of the item-response probabilities, I named these four classes (1) straight males, (2) minimal sexual expression males, (3) mostly straight and bi males, and (4) emerging gay males. I describe the model predictions for each of these classes in the following text, with details in Table 2.

Among males, 87.4% fall into the straight males class. Item-response probabilities predict several defining characteristics of this class. Among straight males, 41.7% are expected to have sex with an other-sex partner in their teen years (Wave I, ages 16 to 18), while the rest have not had sex yet. In their late 20s (Wave IV), 86.8% report sex with an other-sex partner. Of note is that when straight male respondents are teens, there is a 6.0% probability that they will endorse attractions to both males and females. However, attractions in the early and late 20s (Waves III and IV) are aimed almost exclusively at the other sex (97.1% and

Table 2. *Four-Class Male Model (N = 3,209) and Five-Class Female Model (N = 3,655) of Sexual Orientation Trajectories*

	Male Model Latent Classes				Female Model Latent Classes				
	Straight	Minimal Sexual Expression	Mostly Straight/Bi	Emerging Gay	Straight	Minimal Sexual Expression	Mostly Straight Discontin.	Emerging Bi	Emerging Lesbian
Overall class membership for that model	87.4%	6.5%	3.8%	2.4%	73.8%	7.0%	10.2%	7.5%	1.5%
Item-response probabilities									
Teens sex									
Other sex	41.7%	1.0%	33.5%	18.5%	44.2%	4.8%	53.0%	63.1%	24.8%
Both sex	0.4%	2.4%	0.9%	4.8%	0.8%	0.0%	0.7%	1.0%	2.2%
Same sex	0.2%	0.0%	1.0%	10.0%	0.4%	0.0%	0.3%	0.3%	4.6%
No sex	57.6%	96.6%	64.7%	66.6%	54.6%	95.2%	46.0%	35.5%	68.4%
Teens attraction									
Other sex	86.8%	39.9%	78.1%	44.5%	91.7%	68.9%	84.9%	70.7%	68.9%
Both sex	6.0%	7.1%	13.2%	37.6%	2.4%	2.6%	11.1%	19.6%	12.6%
Same sex	0.4%	4.4%	3.2%	11.4%	0.6%	0.6%	1.7%	2.7%	9.9%
No sex	6.8%	48.6%	5.6%	6.4%	5.4%	27.9%	2.4%	7.0%	8.6%
Early 20s sex									
Other sex	84.4%	27.3%	72.0%	8.4%	88.1%	26.6%	87.0%	79.3%	15.0%
Both sex	0.0%	0.0%	4.7%	18.3%	0.4%	2.8%	5.5%	8.0%	26.4%
Same sex	0.2%	0.0%	1.7%	49.7%	0.0%	1.5%	0.8%	0.5%	43.6%
No sex	15.4%	72.7%	21.6%	23.6%	11.5%	69.1%	6.7%	12.2%	15.0%
Early 20s attraction									
Other sex	97.1%	67.8%	65.5%	8.6%	98.0%	76.4%	32.1%	40.5%	20.3%
Both sex	1.6%	7.1%	33.7%	53.5%	0.5%	4.2%	67.2%	58.0%	59.3%
Same sex	0.0%	0.7%	0.9%	37.9%	0.2%	0.0%	0.6%	1.5%	17.8%
No sex	1.3%	24.4%	0.0%	0.0%	1.4%	19.4%	0.2%	0.0%	2.6%
Early 20s label									
“100% heterosexual”	99.2%	89.2%	31.2%	9.3%	99.6%	91.3%	19.0%	44.7%	13.8%
“Mostly heterosexual”	0.8%	4.6%	62.5%	1.2%	0.3%	5.8%	73.9%	36.1%	9.9%
“Bisexual”	0.0%	0.0%	4.2%	6.8%	0.0%	0.1%	5.2%	16.0%	15.9%
“Mostly homosexual”	0.0%	0.0%	2.1%	28.2%	0.0%	0.1%	1.8%	2.4%	21.2%
“100% homosexual”	0.0%	0.0%	0.0%	54.5%	0.0%	0.0%	0.1%	0.0%	39.1%
No label	0.0%	6.2%	0.0%	0.0%	0.1%	2.8%	0.0%	0.9%	0.0%
Late 20s sex									
Other sex	87.5%	42.3%	65.9%	0.3%	86.3%	36.1%	87.0%	72.4%	2.9%
Both sex	0.1%	0.0%	12.0%	0.3%	0.7%	0.0%	3.4%	18.6%	9.3%
Same sex	0.0%	1.4%	0.2%	94.2%	0.0%	0.4%	0.0%	3.2%	83.8%
No sex	12.4%	56.4%	21.8%	5.2%	13.0%	63.5%	9.6%	5.8%	4.0%
Late 20s attraction									
Other sex	98.2%	86.0%	81.3%	0.3%	98.6%	92.1%	100.0%	1.3%	3.0%
Both sex	0.9%	4.7%	18.5%	10.8%	0.3%	0.0%	0.0%	97.1%	4.2%
Same sex	0.1%	0.0%	0.1%	88.9%	0.3%	2.0%	0.0%	0.0%	92.9%
No sex	0.8%	9.3%	0.0%	0.0%	0.8%	5.9%	0.0%	1.6%	0.0%
Late 20s label									
“100% heterosexual”	98.7%	94.1%	43.7%	0.4%	93.6%	88.1%	49.0%	2.2%	0.3%
“Mostly heterosexual”	1.4%	3.3%	46.7%	0.0%	6.4%	5.4%	50.9%	65.9%	0.1%
“Bisexual”	0.0%	0.0%	8.5%	1.9%	0.0%	0.0%	0.1%	29.6%	2.2%
“Mostly homosexual”	0.0%	0.0%	0.0%	20.5%	0.1%	0.3%	0.0%	2.4%	41.5%
“100% homosexual”	0.0%	0.1%	0.0%	77.2%	0.0%	0.0%	0.0%	0.0%	56.0%
No label	0.0%	2.5%	1.1%	0.0%	0.0%	6.2%	0.0%	0.0%	0.0%

Note. The rows indicate first the probability of membership in that class (the chance that a random male would fall into that male class or a random female would fall into that female class) and then the item-response probabilities (the likelihood that individuals in that class would indicate that response). Item-response probabilities are shown for each dimension of orientation (sexual relationships, attractions, and self-labels) for each time point they were collected (teens, early 20s, and late 20s). Each column represents a distinguishable and meaningful class with an assigned name.

98.2%, respectively). Straight males overwhelmingly label themselves as “heterosexual” in their early and late 20s (Waves III and IV).

Among males, 6.5% fall into the minimal sexual expression males class. Item-response probabilities predict several

expected characteristics among this class. Most notably, the vast majority (96.6%) of minimal sexual expression males did not have sex in their teens, and the level of sexual activity remains consistently very low compared to other classes (72.7% and 56.4% have not had sex in their early and late

20s, respectively). Compared to other classes, a large proportion of males in this class (almost half) report no attractions at all as teens. By their early 20s, about one-fourth still do not report any attractions, and one-tenth of males in this class do not report any attractions in their late 20s, which is high compared to other classes. Unlike the straight males class, the 7.1% level of both-sex attraction from the teen years is maintained in the early 20s. However, there is almost no concordant both- or same-sex sexual activity in this class. In terms of self-labels, most say they are “heterosexual” (89.2% in the early 20s, growing to 94.1% in the late 20s), with a few choosing “mostly heterosexual.” In addition, this class has a small proportion of males who indicate that they do not have an orientation label.

Among males, 3.8% fall into the mostly straight and bi males class in the middle of the orientation continuum. A small proportion of males in this class report both-sex sexual experiences in their early 20s, increasing by the late 20s. While the majority indicate other-sex sexual activity by their 20s, this level of other-sex sexual activity is relatively low compared to the straight males class (but not as low as the minimal sexuality males class). While most members of the mostly straight and bi males class report other-sex attractions, a substantial proportion report both-sex attractions, especially in their early 20s, when one-third do so. Last, the majority identify as “mostly heterosexual” or “bisexual” through their 20s.

Among males, 2.4% fall into the emerging gay males class. This class is characterized by very low levels of other-sex relationships in the teens and early 20s, with dramatic increases in same-sex relationships, so that in their late 20s almost all males in this class (94.2%) report only same-sex relationships. Attractions are also almost exclusively same sex (88.9%) or both sex (10.8%) in the late 20s. “Homosexual” identity grows

to over three-quarters in the late 20s, with the remainder identifying as “mostly homosexual” (20.5%) and a few (1.9%) as “bisexual.”

Five-Class Female LLCA Model

For the female subsample models, the low CAIC, BIC, and adjusted BIC, along with the high entropy shown in Table 1, favored a five-class model, as did interpretability of the resulting classes. From this model, the item-response probabilities predict and define five distinguishable and meaningful groups, which I named (1) straight females, (2) minimal sexual expression females, (3) mostly straight discontinuous females, (4) emerging bi females, and (5) emerging lesbian females. I describe these classes in the following text, with details in Table 2. Comparisons between the most similar classes from the male and female models are also provided (Figures 1 through 4).

Among females, 73.8% fall into the straight females class. The predicted patterns of sexual activity among this class are almost identical to straight males (see Figure 1), with similar proportions having sex with an other-sex partner over time. Among straight females, 44.2% have sex with an other-sex partner in their teen years (Wave I, ages 16 to 18). In their late 20s (Wave IV), 86.3% have sex with an other-sex partner. In contrast to the straight males, only 2.4% of straight females indicate both-sex attractions in their teens (Wave 1, ages 16 to 18), which drops to less than 0.5% in the early and late 20s (Waves III and IV). The probability that straight females label themselves “heterosexual” in their early 20s (Wave III) is 100%, but by the late 20s (Wave IV) a small proportion indicate “mostly heterosexual.”

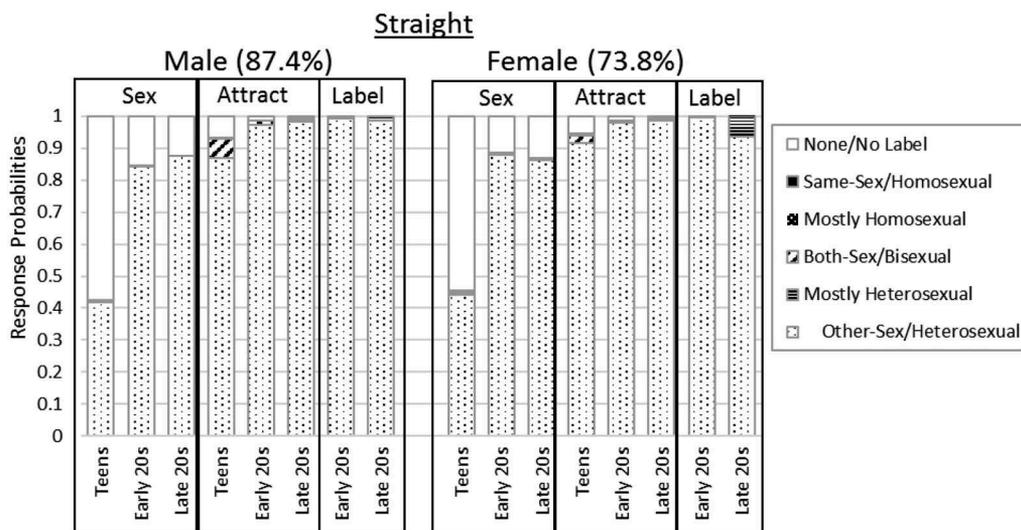


Figure 1. Straight classes from the male model ($N = 3,209$) and the female model ($N = 3,655$) compared side by side, with item-response probabilities for dimensions (sexual relationships, attractions, and self-labels) across waves.

Among females, 7.0% fall into the minimal sexual expression females class. Item-response probabilities indicate several predicted characteristics among this class. Most notable are the exceptionally and consistently low levels of sexual activity, similar to the minimal sexual expression males class (Figure 2). No sexual activity is expected of 95.2% of females in this class in their teens, and about two-thirds do not report sexual activity in their early or late 20s. Although the females in this class reported more attractions in the teen years compared to the minimal sexual expression males class (Figure 2), their levels of attraction are low compared to other female classes. For example, one-fifth of females in this class report no attractions at all in their early 20s. Through their 20s, about nine out of 10 females in this class choose the self-label of “heterosexual,” and about 5% choose “mostly heterosexual.” A small proportion self-label as having no orientation identity.

Among females, 10.1% fall into the mostly straight discontinuous females class that often peaks in the early 20s. Most notably, both-sex attractions grow to 67.2% in their early 20s (twice the level of the mostly straight and bi males class; Figure 3) but then drop precipitously, so that 100% report only other-sex attractions by their late 20s. This discontinuity of interest in both-sex attractions is accompanied by a drop in the proportion who self-identify as midcontinuum, from 5.2% identifying as “bisexual” and 73.9% identifying as “mostly heterosexual” in their early 20s to just 50.9% identifying as “mostly heterosexual” by their late 20s. Across the waves, females in the mostly straight discontinuous class have levels of other-sex sexual relationships similar to females in the straight class, starting at 53.0% in their teens and reaching 87.0% by the early 20s. However, a small proportion (6.3% in early 20s and 3.4% in late 20s) report same- or both-sex relationships.

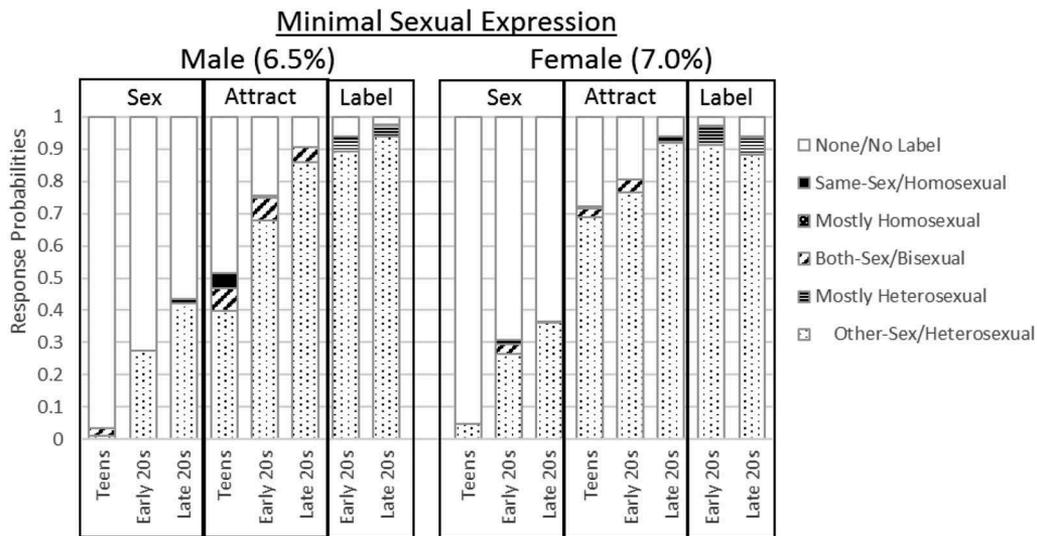


Figure 2. Minimal sexual expression classes from the male model ($N = 3,209$) and the female model ($N = 3,655$) compared side by side, with item-response probabilities for dimensions (sexual relationships, attractions, and self-labels) across waves.

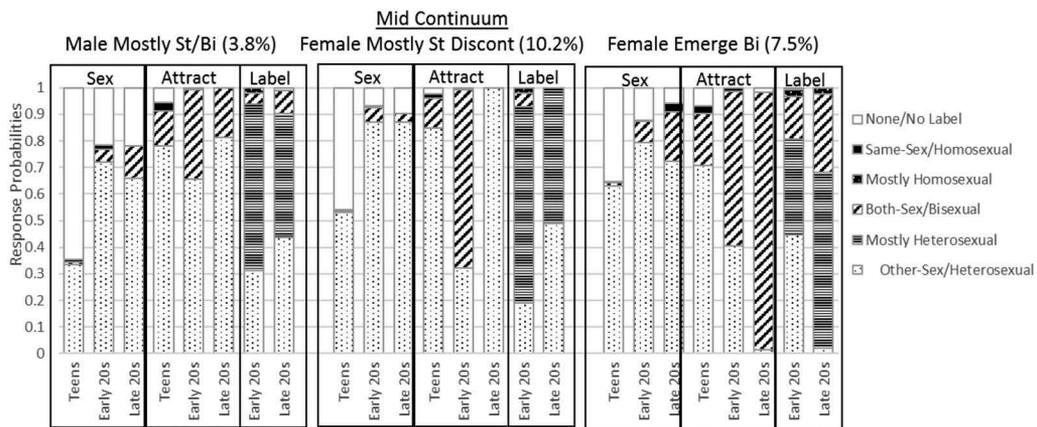


Figure 3. Midcontinuum classes from the male model ($N = 3,209$) and the female model ($N = 3,655$) compared side by side, with item-response probabilities for dimensions (sexual relationships, attractions, and self-labels) across waves.

Among females, an additional 7.5% fall into another midcontinuum group: the emerging bi females class. Same- or both-sex attractions appear in the teens for more than one-fifth of females in this class; and by the late 20s, fully 97.1% report attractions to both males and females. This sizable growth in both-sex attractions is accompanied by a steady increase in non-“heterosexual” self-labeling so that by the late 20s, 65.9% self-identify as “mostly heterosexual,” 29.6% as “bisexual,” and 2.4% as “mostly homosexual” (much higher levels compared to the mostly straight and bi males class; Figure 3). In their late 20s, more than one-fifth of the females in this class report same- or both-sex relationships.

Last, among females, 1.5% fall into the emerging lesbian females class. Overall, the predicted characteristics have many similarities to the emerging gay males class (Figure 4), with dramatic increases in same-sex relationships (83.8% exclusively same sex and 9.3% both sex by the late 20s) and attractions (92.9% same sex and 4.2% both sex by the late 20s). “Homosexual” identity grows so that by the late 20s, almost all females in this class endorse “100% homosexual” (56.0%) or “mostly homosexual” (41.5%) labels. Compared to the emerging gay males class, females in this class report more other-sex attractions in their teens, and they are more likely to label themselves “mostly homosexual” versus “100% homosexual” in their late 20s (Figure 4).

Discussion

Examining multiple dimensions of identity, romantic experiences, and sexual behavior longitudinally, and in combination rather than individually, provides new insight into the developmental experiences of different feelings, the

exploration of behaviors, and the sometimes evolving nature of sexual orientation identity in adolescence into adulthood, with unique results for males and females. Based on these results, a typology of nine classes (four male and five female) can be used to describe the multidimensional sexual orientation continuum longitudinally. A careful examination and comparison of these classes highlights several issues.

Male and Female Models and Pathways

Male and female developmental trajectories have distinct similarities and differences. For example, both male and female models produced some classes with consistencies across sex, such as the straight classes both showing similar levels of sex with other-sex partners across waves. Indeed, many commonalities are reflected in the similar names I applied to the male and female classes. However, the models differed in how common such trajectories were, with almost nine out of 10 males falling in a straight class, but less than three-fourths of females following such a path. Moreover, within trajectories across the male and female models that were similar enough to result in my giving them similar class names, there were some sex differences. For example, although those in the minimal sexual expression males class and the minimal expression females class both show very low levels of sexual activity, those in the female class are much more likely to report attractions in the teen years (Wave I, ages 16 to 18), perhaps conforming to early gender expectations of having crushes (Myers & Raymond, 2010).

A notable area of differences between males and females lies in the midcontinuum versus the ultimately exclusive pathways. Fewer than one in 25 males fall into the only male midcontinuum profile, the mostly straight and bi males class, which shows occasional sexual experiences with and

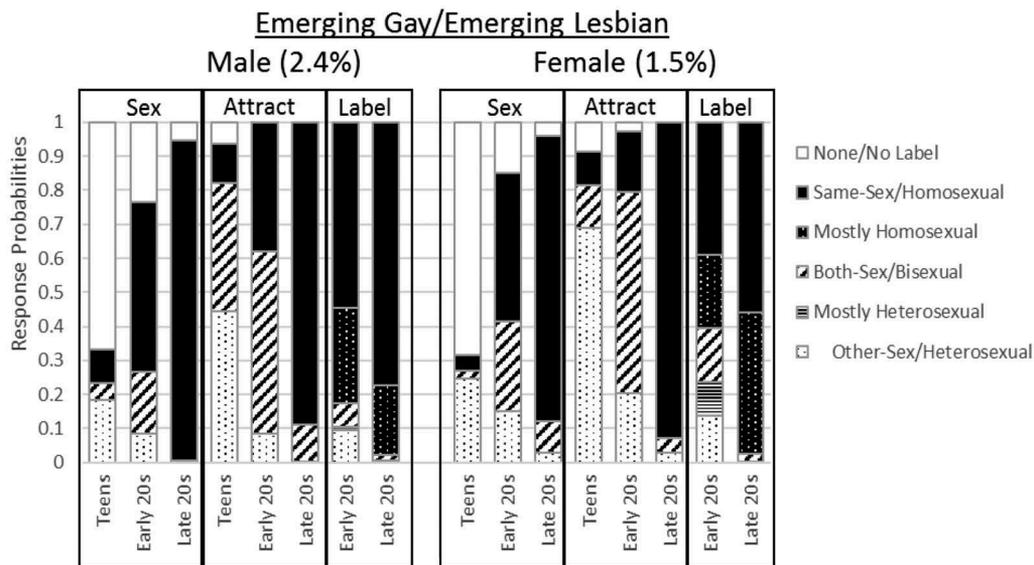


Figure 4. Emerging gay and emerging lesbian classes from the male model ($N = 3,209$) and the female model ($N = 3,655$) compared side by side, with item-response probabilities for dimensions (sexual relationships, attractions, and self-labels) across waves.

attractions to both sexes and a majority self-labeling as “bisexual” or “mostly heterosexual.” Instead, males demonstrated more stability and exclusiveness on the two ends of the spectrum. Males not only show higher numbers in the straight class compared to females, but also show higher numbers in the emerging gay males class (which demonstrates exclusive same-sex behavior by the late 20s) compared to the number of females in the emerging lesbian females class (which is not exclusively same-sex behavior by the late 20s for a small portion of class members). In contrast to the lower proportion of males in the midcontinuum (fewer than one in 25), more than one in six females fall into a midcontinuum class. This finding is consistent with previous literature indicating females might experience more both-sex attractions and, considering that these classes illustrate patterns of both discontinuity and growth, also potentially consistent with greater sexual fluidity among females (Diamond, 2008, 2012) or differences in developmental exploration and psychosexual trajectories that may delay stability. Such differences may be driven by a combination of biological differences and contextual differences in gender roles and expectations (Baumeister, 2000) that may shape developmental trajectories and favor more experimentation and situational flexibility for a longer period among females.

Midcontinuum Female Classes: Patterns of Growth and Discontinuity

More than one in 10 females fall in the mostly straight discontinuous females class, where both-sex attractions spike in early 20s but then drop precipitously. Among the most likely to self-label as “mostly heterosexual” in their early 20s, this class experiences a drop in self-identifying within the midcontinuum by the late 20s to accompany the extreme discontinuity in attractions. Although across the waves this class has levels of other-sex sexual relationships similar to females in the straight class, the female model indicates a clearly distinct trajectory of orientation-related experiences for this group. A small proportion in this class reports same-sex or both-sex sexual relationships, but the main characterizing trait lies in the attraction dimension’s longitudinal characteristics. This would not have been detectable without LLCA techniques, which are particularly good at detecting subtle and discontinuous developmental periods (Lanza & Collins, 2006).

To some extent, the mostly straight discontinuous females class demonstrates similarities to previous research, indicating that those who identify as “mostly heterosexual” show unique patterns of attraction and partners, distinct from adjacent identities (Savin-Williams & Vrangalova, 2013; Vrangalova & Savin-Williams, 2012). For example, they had occasional but rare same-sex behavior, and they had some same-sex attractions. Although the attraction disappeared over young adulthood, the self-label did persist to some degree. There are several possible explanations for why this

class peaks in the early 20s. More people pair up in longer-term committed relationships as young adulthood progresses (Halpern & Kaestle, 2014), which could lead to fewer sporadic attractions being expressed to the sex that does not match the long-term partner. Fertility and family formation plans may also play a role in movement toward an other-sex focus in the late 20s for women. Longer-term pairing at this time of life would mean that individuals who express midcontinuum self-labels in early young adulthood but lean more toward other-sex partners might start seemingly to disappear from the midcontinuum over time. Also, the early 20s, especially for those attending college, often represent a time of immersion in more liberal attitudes (Lefkowitz, 2005; Lefkowitz & Gillen, 2006) that may make the exploration, questioning, or acknowledging of same-sex attractions more acceptable and comfortable at that age. Such a time in life may also inspire more political reasons to identify as not “100% heterosexual” to support sexual minority rights or to indicate an understanding of the potential for same-sex attractions more generally (Savin-Williams & Vrangalova, 2013).

The last midcontinuum class, emerging bi females (about one in 13 females), is different in that it shows sizable growth in both-sex attractions across all the waves, accompanied by an increase in non-“heterosexual” self-labeling, so that by the late 20s well over half identify as “mostly heterosexual” and almost one-third identify as “bisexual.” The teen years show some conformity to heteronormative indicators in sexual activity and attractions. However, almost all report both-sex attractions in their late 20s. This substantial class, which matures and persists through young adulthood, does not support the stereotype of bisexuality as a transition phase (Firestein, 2007; Israel & Mohr, 2004). This provides a good illustration that the steady development from conformity to heteronormative expectations in adolescence growing to a persistent sexual minority status such as the emerging bi class by the late 20s is not the same as sexual fluidity (Diamond et al., 2017), which indicates flexible and multi-directional movement in sexual identity in response to changing situational contexts (emerging gay males and emerging lesbian females classes, discussed later, also illustrate this point of development versus fluidity).

Sexual Orientation Development Continues Intensely Through Young Adulthood

Taken together, all the midcontinuum classes demonstrate longitudinal patterns with extensive changes throughout the 20s. Sexual orientation development is often considered a task of adolescence, but the large extent of changes extending through the last time point indicates that sexual orientation development is a task that spreads long past adolescence and into adulthood. This impression of substantial changes late in young adulthood is further supported by two additional classes that were clearly emerging over the entire time period: the emerging gay males class and the emerging lesbian females class. The substantial

levels of change from early 20s to late 20s in these classes demonstrate that young adulthood is still a very dynamic time for sexual orientation development (Diamond, 2000; Halpern & Kaestle, 2014; Savin-Williams & Ream, 2007). It is possible that this process is delayed by social and political environmental factors. The many potential forward drivers of this process may include more independence, distance from less flexible childhood gender norms, increased availability of options in sexual partnerships, trends toward increasing levels of intimacy and length of relationships, family formation, and more liberal attitudes and contexts common in emerging adulthood (Halpern & Kaestle, 2014).

Differences in Developmental Experiences Between Straight and Emerging Classes

All of the emerging classes have a very different set of developmental experiences compared to the straight classes. For those in the straight classes, when sexual activity begins it is immediately targeted toward one sex (i.e., the other sex) that then stays consistent across the waves. For the straight classes, we see largely other-sex-consistent indicators across dimensions and time. In contrast, emerging gay males and emerging lesbian females who have sex in their teens (ages 16 to 18) mostly start with other-sex partners. It is not until the late 20s that most people in these groups report all same-sex partners. Similarly, many report only other-sex attractions during their teens (especially in the emerging bi females and emerging lesbian females classes). Then they gradually progress through adjacent categories on the continuum through the early 20s to ultimately reach the point in the late 20s when almost all emerging bi females report both-sex attractions, almost all emerging gay males report male-only attractions, and almost all emerging lesbian females report female-only attractions. Self-labels also solidify more firmly between the early 20s and late 20s toward increasing endorsement in the same-sex direction on the continuum. This demonstration of early conformity to more heteronormative indicators illustrates a key difference in the experiences of straight males and females compared to those in traditional sexual minority groups (bi, gay, and lesbian). It means that many sexual minority youth experience some shifting across adjacent categories within each of the dimensions over time, supporting conceptualizations of orientation as developmental throughout emerging adulthood. Trends toward more same-sex indicators across dimensions might be driven by circumstances such as moving away from or rejecting early environmental factors that imposed heteronormative expectations and prejudices. If so, shifting political landscapes may also open possibilities for earlier sexual orientation development experiences. In addition, for the emerging gay males or emerging lesbian females classes, shifting from midcontinuum to same-sex activities, attractions, and labels may result from a narrowing of sexual and romantic focus as people pair

together for longer-term, more committed relationships with same-sex partners later in emerging adulthood, resulting in increased bi-invisibility.

Low Sexual Expression and Asexuality

About one in 15 of males and females are represented in the minimal sexual expression classes, with extremely low levels of sexual activity. Such low sex activity in adulthood may indicate some late bloomers, purposeful abstainers, or lack-of-opportunity virgins (Haydon, Cheng, Herring, McRee, & Halpern, 2014). However, these factors fully explain neither the much-depressed levels of even reporting attractions nor those few who report no identity. These indicators support the presence of an asexuality continuum at play in these classes. Although asexuality is sometimes defined as a complete lack of sexual attraction, others have suggested a spectrum that would include the experiences of, for example, “gray-A’s,” who rarely but sometimes have sexual attractions, or demisexuals, who need a strong romantic bond before feeling sexual attraction (Brotto & Yule, 2017; Prause & Graham, 2007; Van Houdenhove, Enzlin, & Gijs, 2017). Certainly, there is growing acknowledgment that asexuality encompasses a range of heterogeneous experiences and does not exclude all sexual activity or occasional attractions (Van Houdenhove et al., 2017; Yule, Brotto, & Gorzalka, 2017).

Scholars have suggested that asexuality may be a unique sexual orientation (Brotto & Yule, 2017; Yule et al., 2017), which would be in line with the current results showing distinct male and female classes with a minimal or low level of sexual expression and interest. However, to the extent that some attractions and sexual activity were reported, minimal levels of sexuality may be orthogonal to the issue of the sex one might orient that attraction toward when it happens. In this way, asexuality and strength of attraction could represent a dimension of sexual orientation orthogonal to the issue of the sex of the target of attraction (Bogaert, 2015).

Indeed, the large majority of those in the minimal sexual expression classes self-label as “heterosexual,” challenging the idea that people who self-identify as “heterosexual” are a unified group without nuance. Many of those who self-identify as “heterosexual” in this class do not report any specific attractions when asked about whether they are attracted to males or females. Issues could include inconsistent awareness or fluctuating feelings of connection to asexuality or a hesitancy in coming out and acknowledging no or a low level of attraction (Bogaert, 2015). Evidence indicates substantial discrimination and low regard for asexuality compared to other sexual orientation groups (MacInnis & Hodson, 2012), and such stigma could discourage people from departing from more mainstream sexual orientation labels (Yule et al., 2017). If researchers recognize an asexual or minimal sexuality group that includes some attractions, they may benefit from offering respondents the option to place themselves simultaneously on an asexuality spectrum as well as a same-sex versus other-sex partner focus continuum. For

example, in the male and female classes here, we see the occasional presence of both-sex attractions and some “mostly heterosexual” labeling, indicating that these classes may cross more traditional categories of sexual orientation (rather than being mutually exclusive) and simply indicate low interest and activity overall.

Strengths and Limitations

This developmentally informed study of a nationally representative sample used a statistical method, LLCA, that has a trifecta of benefits: it is longitudinal; it is multidimensional; and it incorporates interactions through a person-centered determination of a multiclass typology. Of particular advantage is that it can detect subtle discontinuous patterns. For a field that often relies on convenience samples of self-identified people, a multidimensional and person-centered measure has advantages for research purposes, capturing a more nuanced set of profiles representing longitudinal trajectories and unique patterns of a broad spectrum of orientation experiences (e.g., using self-labels alone with these data would have missed substantial heterogeneity in developmental experiences). However, the study also had some drawbacks that must be considered when interpreting the results.

In this study, I used LLCA to create a new typology of longitudinal latent classes of detectable size to describe dynamic multidimensional processes from adolescence through the late 20s. However, latent class approaches are not ideal for distinguishing the smallest of groups (Lanza et al., 2007), so some groups that might have support in the literature or are of theoretical importance, such as mostly heterosexual versus bisexual males, or purely asexual versus more general minimal sexual expression, may be undetectable with these analyses. Therefore, although the results of the LLCA suggest that only four male and five female classes are needed to account for heterogeneity in sexual orientation trajectories, additional work may be warranted to produce a final typology consistent with existing evidence and theory. For example, results indicate more females in the midcontinuum classes, which may have facilitated the model’s ability to distinguish classes of growth and discontinuity. With a comparatively smaller 3.8% of males falling into the midcontinuum, we may not be able to distinguish more than a single class specified. The current results indicate that nonstraight males tend to lean more to one direction or the other, falling into either the more exclusive emerging gay class or the nonexclusive but more other-sex-oriented mostly straight/bi class, similar to the mostly straight and sexually fluid men described in recent research (Savin-Williams, 2017). However, this class could represent an average between a mostly heterosexual experience overshadowing a smaller group of emerging bisexual men. Thus, if such distinctions are important to a future examination of health inequities, the classes determined here could be used to create a typology that is also augmented by such finer distinctions.

Another study limitation is that there have been concerns in the literature about the nature of some possibly mischievous responders in their teens providing misleading answers to the attraction question in Add Health. A few respondents reported same- or both-sex attractions at Wave 1 but then gave no later indications of sexual minority status at all in any subsequent waves or other dimensions. These respondents may have been confused about the question or may have mischievously given extreme answers to the questions (Savin-Williams & Joyner, 2014). For this reason, some have questioned the utility of looking at reported attractions in the teen years at all. However, LLCA provides a way to parse such responders to incorporate them into a class that fits the larger patterns they reveal across waves and dimensions. This results in the males in the straight class in this analysis having a 6% probability of reporting both-sex attractions in their teens. These males may have been mischievous responders, or they may have been questioning their sexuality, or they may have gone back into the closet after their teen years in response to minority stress and social pressures (Fish & Russell, 2018; Katz-Wise, Calzo, Li, & Pollitt, 2015; Li, Katz-Wise, & Calzo, 2014). In this way, LLCA may be misclassifying a small group that had some early same-sex attractions as not sexual minorities. However, by relying on cohesive groups based on the preponderance of a person’s pattern of responses, LLCA does provide the opportunity to incorporate teen attraction data to gain a longitudinal perspective on the early experiences of other groups. For example, if we ignored the teen attraction data, we would not have as much insight into the early experiences of the mostly straight and bi males class (who are twice as likely to report both-sex attractions in the teen years compared to straight males) or the emerging gay males class (who report them at six times the rate as straight males). In some ways, an LLCA approach could be seen as a compromise approach. Alternatively, one could separate out the 6% of straight males class into their own group for theoretical reasons and perform sensitivity testing to determine if they had different health risk profiles.

Last, cohort effects and the restricted period of development under study should be considered in interpreting this work. For methodological reasons (see Sample section), models do not include data from before the age of 16. Thus, unique features of early adolescent trajectories were not characterized or incorporated in these results. Rather, the current study focuses on a specific cohort—people who were 16 to 18 years old in 1995—and follows them from late adolescence through emerging adulthood and into the late 20s. Any study that wishes to follow development from a life-course perspective over decades of time will of course need to consider large-scale social changes in interpreting how findings might be generalized. Clearly, these results and descriptions of trajectories apply directly to those Americans who are just leaving emerging adulthood and entering middle adulthood now. This typology will provide

a window into understanding existing health disparities among the adult population and can be used to predict developmental and health experiences of the next wave of Add Health data. When considering those just entering emerging adulthood now, because of political changes, trends in how young people label sexuality, and greater social acceptance of nonheterosexual identities, researchers can expect a larger proportion to fall into profiles that are not stereotypically straight identities and include more same-sex attractions and behavior (Coleman-Fountain, 2014; Diamond, 2008, 2016; Dilley, 2010; Manley, Diamond, & van Anders, 2015; Russell et al., 2009; Twenge, Sherman, & Wells, 2015). Comparisons of data across generational cohorts will be critical for future research into how sexual development and health inequities might shift over time in response to changes in the social and political landscape.

Conclusions

Defining sexual minority status has been identified as one of the most important and persistent problems in sexuality and health research (Institute of Medicine, 2011; Savin-Williams, 2008). Results of this study reveal a new typology of longitudinal latent classes that describes dynamic multidimensional processes continuing from late adolescence through the late 20s. Analyses showed significant differences between the orientation experiences of males and females. Several classes represent generally consistent indicators across dimensions over time, while other classes describe more fluid, discontinuous, or emerging patterns. Longitudinal patterns show substantial change through the early and late 20s, indicating that orientation development as a task spans young adulthood. The LLCA person-centered statistical approach provided unique insights because it can detect subtle discontinuous patterns, but LLCA approaches cannot distinguish smaller theoretical groups (e.g., bisexual versus mostly straight males), so additional work may be warranted to produce a final typology consistent with existing evidence and theory.

This study has important implications for public health research, programming, and advocacy. The field of public health is just starting to recognize the wide range of health disparities faced by sexual minority groups, with research still in its fledgling stages and showing discrepancies in the magnitude of disparities among studies (Institute of Medicine, 2011). How sexual minorities are identified likely affects the prevalence as well the strength of associations between sexual minority status and health outcomes, and the common use of single measures, clumping of subgroups, and cross-sectional data collection may contribute to inconsistencies in health disparities detected. The current study indicates that no single measure of sexual orientation is sufficient to capture sexual minorities at any given point in time. Such measures would miss large numbers of people in

nonstraight classes (underestimating the variety of sexual minority trajectories), and they would not capture subtle differences and transitions in developmental trajectories that may make some youth more vulnerable to specific risks at specific times. The current study approached sexual minority status as a nuanced, person-centered, multidimensional, and time-varying construct, improving validity and accounting for the high levels of interactions among dimensions that can characterize developmental trajectories.

Adolescence and young adulthood are critical times not only in the development of sexual orientation but also for the early factors that later manifest as substantial health inequities in areas such as smoking, alcohol consumption, substance use, sexual health, stigma, discrimination, violence, suicidality, and depression (Institute of Medicine, 2011). These health disparities follow their own parallel developmental trajectories. For example, if some teen populations start smoking or progress to daily smoking younger than other teens, these populations will face greater addiction and difficulty quitting, which will translate into serious health disparities that increase in severity later in adulthood. Future work can pair analyses of sexual orientation development with distinct trajectories in the onset and development of risk exposures and behaviors to tie specific orientation trajectories with characteristic health trajectories. This could not only identify which sexual minority trajectories are at most risk for various health disparities but also demonstrate timing issues, showing how orientation development may influence health transitions in real time. Such research could substantially advance the development and targeting of health interventions. In designing health interventions for minority groups that may experience accumulating stresses, researchers must also keep in mind that minority social identities such as orientation, race, and class can interact in ways that challenge traditional additive approaches, creating situations of double or triple jeopardy (Rosario et al., 2014; Russell, Driscoll, & Truong, 2002; Warner & Shields, 2013). Next steps include an exploration of how these measures overlap and intersect with multiple minority statuses to influence mental health and health-related behaviors and outcomes.

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