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The Causal Ordering of Prominence and Salience in Identity Theory: An Empirical Examination

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Abstract

Identity theory invokes two distinct but related concepts, identity salience and prominence, to explain how the organization of identities that make up the self impacts the probability that a given identity is situationally enacted. However, much extant research has failed to clearly distinguish between salience and prominence, and their empirical relationship has not been adequately investigated, impeding a solid understanding of the significance and role of each in a general theory of the self. This study examines their causal ordering using three waves of panel data from 48 universities focusing on respondents' identities as science students. Analyses strongly support a causal ordering from prominence to salience. We provide theoretical and empirical grounds to justify this ordering while acknowledging potential variation in its strength across identities. Finally, we offer recommendations about the use of prominence and salience when measures of one or both are available or when analyses use cross-sectional data.

Keywords

identity theory; self and identity; identity processes; education; socialization

Derived from a structural symbolic interactionist frame or perspective, identity theory begins by accepting a summary formulation of social process derived from George Herbert Mead (1934), namely, that society impacts self, which impacts social behavior (Serpe and Stryker 2011; Stryker 2008). In keeping with its underlying symbolic interactionist perspective, identity theory views society as a multiplicity of relatively stable and organized sets of interactive role relationships, namely, as social structures; it visualizes self as conceptions of the meanings attached to the role relationships in which persons are implicated, and it conceives of social behavior as role-related activity. To allow and implement empirical tests of this nascent explanatory theory, each of its three elements is further specified: social structures are specified as large or small social settings that are relatively stable (over time) organizations of interpersonal behaviors. These settings serve as boundaries demarcating sets of social beings inside the set from others who are outside the set. The self is conceived

as incorporating identities, visualized as “‘parts’ of self, internalized positional designations existing insofar as the person is a participant in structured role relationships” (Stryker [1980] 2003:60). The theory specifies “identity salience” as a significant link between social structural influences on interpersonal behaviors and the interpersonal behaviors themselves.¹ The interpersonal behavior specified as what the nascent theory intends to explain is role-related choice.²

Since individuals in modern societies typically participate in a variety of differentiated relationships, the theory argues that persons have multiple selves (James [1890] 1950) and so will contain a multiplicity of identities, the number and nature of which are a function of the roles filled in interaction with others. Identities are defined as the set of possible meanings of roles in the form of expectations of others for one or more of these possible meanings. They require that the meanings be internalized by actors.

Identity theory predicts that the likelihood of a given identity being played out in social interaction will be significantly impacted by the salience of the identity relative to the salience of other identities the person holds. Identity salience is defined as the probability that a given identity will be invoked in social interaction (Stryker 1968, [1980] 2003) or, alternatively, as a substantial propensity to define a situation in a way that provides an opportunity to perform that identity (Stryker and Serpe 1982). An identity’s salience indicates its relative position in a hierarchy of salience ranked by its propensity of being called up: identity theory predicts that a highly salient identity is likely to be enacted or to define a situation to promote its own enactment.

In roughly the same period in which identity theory was initially formulated, a similar yet distinct set of ideas stemming from a different, more traditional version of a symbolic interactionist perspective appeared (McCall and Simmons 1978). Many sociologists find this perspective attractive, in good part because it gives relatively free reign to human agency, enabling the individual to shape his or her own existence.³ More focused on process than structure and more concerned with illustrating the utility of one’s subjective sense of the import of an identity with respect to his or her social behavior than with developing an empirically testable theory, McCall and Simmons (1978) adopt a multiple self, multiple identity perspective and use the language of identity prominence to describe significant variations in selves and identities. For McCall and Simmons, the prominence hierarchy has the same function as identity salience in relation to social behavior, with the distinction that the prominence hierarchy reflects the individual’s ideal self. They argue, among other things, that while identities can be imposed on the person by the external social world, they are typically negotiated in interactive settings. Too, while persons can claim an identity, others with whom they interact may not recognize these claims.

¹That salience is a significant but not an exclusive link is an initial assumption of the theory.

²The question chosen to illustrate this putative outcome variable in the theory is why, on a free Saturday afternoon, a man chooses to play golf rather than take his children to the zoo (Stryker 1968).

³The identity literature typically provides a theoretical account of circumstances that minimize structural constraints on the formation and maintenance of identities (see Stryker [1980] 2003).

Individuals' subjective sense of the import of an identity also appears in the self literature using the language of "psychological centrality" (Rosenberg 1979), sometimes abbreviated to "centrality." Identity prominence can also be labeled by the more commonsense term "importance," since it is essentially defined as the individual's subjective sense of the worth or value of an identity to himself or herself (Ervin and Stryker 2001). While there are subtle differences in meaning among the three concepts (prominence, centrality, importance), their common thrust is to emphasize the significance of persons' subjective responses to themselves. We use prominence as a surrogate for all three because McCall and Simmons (1978) developed it in the same meta-theoretical context, symbolic interactionism, from which identity theory derives. Most significant in the present context is that whether called prominence, centrality, or importance, the phenomenon referred to carries an affective, emotive tone concordant with Cooley's (1902) theory of the self.⁴

An identity's position in the prominence hierarchy need not necessarily align with the position of the identity in the salience hierarchy (Ervin and Stryker 2001). Clearly, there are identities that are both strongly valued and highly likely to be enacted. Consider the case of a professional woman who is the mother of a school-aged child. She may be likely to define situations outside of interaction with her child as relevant for enactment of her highly prominent "mother" identity, such as acting as a physician caring for patients or as a teacher disciplining students. Other identities may be very strongly valued but unlikely to be performed, for example, when brothers hold identities as a sibling and consider themselves to be tightly knit but live far apart and rarely even speak to one another. Alternatively, identities may be highly likely to be enacted but actively devalued, for example, when an inmate deprecates but nevertheless performs his prisoner identity on a daily basis in interaction with prison guards and other inmates (Asencio and Burke 2011).

The major difference between salience and prominence is definitional, but these definitions have both conceptual and measurement implications. Salience is defined in behavioral terms: it is the probability of persons enacting a given identity across social situations. Distinguished from desired or intentioned behavior, a highly salient identity is not necessarily one that the individual wishes or desires to perform, a point made succinctly by Burke and Stets (2009:41): "The salience hierarchy represents the situational self rather than the ideal self." Prominence, however, reflects the ideal self and is defined as the subjective value or worth to persons of a given identity relative to that of other identities: the valence of the focal identity relative to that of other identities. Implied is that awareness of the salience of an identity is not a necessary feature of its existence. On the other hand, persons are by definition aware of the level of prominence of an identity within their conception of themselves (Ervin and Stryker 2001).

Although the theoretical utility of recognizing salience and prominence as two distinct but related concepts, as posited by Stryker ([1980] 2003), has been demonstrated, the identity literature has muddied these waters in significant ways. Much research fails to clearly distinguish between the two. Thoits (2012) sees the two concepts as strict equivalents, discussing her results in a series of publications using the term *salience* while measuring that

⁴That this is the case becomes more evident in McCall's (2003) chapter on the "not me."

concept by its relative *importance*. Callero's (1985) research on blood donorship as an identity also conflates the concepts by using them synonymously. Serpe (1987) measures salience by using a set of paired comparisons derived from the question: which of the following is more important to the way you think of yourself: course work or dating, dating or family, and so on. Stryker and Serpe (1994) use Serpe's (1987) measure of importance in their earliest research stemming from identity theory. However, they also introduce the concept of identity salience measured by asking subjects to think about meeting (1) a friend, (2) a roommate, (3) someone at a party, or (4) a friend of a close friend for the first time, asking them what they would tell the other person first, second, and so on. More recent measures of salience have been based on the self-reported likelihood that a subject would invoke an identity across situations (Merolla et al. 2012; Owens and Serpe 2003).

The variations in these examples highlight the need for work to clarify the distinction between salience and prominence and investigate their relationship. Stets (2006:95) sees the question of their relationship as a potentially fruitful area of research by asking "does the prominence of an identity influence its salience in a situation or does invoking an identity in a situation influence the importance of that identity for the self?" McCall and Simmons (1978) in effect argue for a causal pathway from prominence to salience, proposing that the higher the placement of an identity in the prominence hierarchy, the more the individual will wish to invoke it. Reaching outside of social psychology, Haidt (2007) links the argument of affect (prominence) as a cause of behavioral expression of an identity to contemporary research in evolutionary neurology.

Burke and Stets (2009) note some, albeit limited, evidence that supports this causal ordering. Nuttbrock and Freudinger (1991) presumed and tested for a prominence-to-salience causal relationship in a sample (N = 132) of first-time mothers and found only weak support for that relationship. Brenner (2011, 2012) applied a model based in identity theory to the overreporting of behaviors associated with two normative identities, church attendance and voting. He argued that identity prominence biases the survey measures of these socially desirable activities, in essence converting a measure of past behavior into a biased measure of identity salience. While those results support a prominence-to-salience causal relationship, the cross-sectional data are not able to rigorously test that relationship.

Stryker and Serpe (1994) begin to address the relationship of prominence and salience, emphasizing the need for appropriate measures of both concepts. They fit a series of structural equation models to data produced in a single wave from a longitudinal data set but were unable to estimate the relationship longitudinally given the inadequate sample size in the early stages of a still developing research design. Consequently, they allowed these concepts to correlate, but neither presumed nor tested for a unidirectional causal relationship.

Understanding the relationship between identity salience and prominence is important not only for the continued development and refinement of identity theory, but also for the improvement of our more general understanding of identities and their measurement for other sociological research programs. Research on key related concepts like self-esteem (Owens and Aronson 2000; Owens and Serpe 2003), self-efficacy (Ervin and Stryker 2001;

Thoits 2003), and emotion (Smith-Lovin 1990, 2002), among others, would benefit from a more well-defined and nuanced understanding of the prominence-salience relationship. Because the central meaning of identity prominence is an affective or emotive valuation of the behavioral expression of the identity, and each of these research programs gives a central place to the affective ramifications of identity enactment, refinement of identity theory may inform and improve understanding of the self in these and other related research programs.

Measurement procedures can introduce artificial concordance between these two concepts, further clouding understanding (Brenner 2011, 2012). Stryker and Serpe (1994:34) posit that salience and prominence may “operate in an equivalent fashion when actors, by any process, become aware of the salience of given identities.” Consequently, priming a survey respondent to consider the identity being measured can motivate the alignment of salience with prominence. Burke (1980:28) adds that “the problem with most measurement situations is that without the normal situational constraints it becomes very easy for a respondent to give us that idealized identity picture which may only seldom be realized in normal interactional situations.” In short, the highly valued identity can motivate the reporting of an “idealized” version of salience on a survey. As models of self-esteem, self-efficacy, and other core social psychological concepts often include measures of identity or are modeled as outcomes of the identity process, improving our understanding of the theoretical specifications undergirding the relationships of these key constructs and their measurement is an important endeavor.

We conclude from the foregoing review of relevant literature that weak measures and methodological limitations, including a failure to examine alternative models, limit the robustness of any conclusions that can be drawn from earlier work on the causal relationship between the prominence and the salience of identities. Nevertheless, it seems evident that the bulk of current opinion favors the view that the causal relationship between the two is one in which prominence impacts salience.

The Present Research

We use a longitudinal data set with sound measures of both identity prominence and identity salience for a key identity of persons in the target population. The relationship between these concepts is examined utilizing three waves of survey data from underrepresented students (i.e., minorities, women, and first-generation college students) in science, technology, engineering, and mathematics (STEM) disciplines from 48 colleges and universities. The focal identity for which prominence and salience are measured is respondents’ identity as a science student.

Alternative models are estimated to examine the relationships between prominence and salience. The primary research question addresses the causal ordering of these constructs. In essence, we ask, does prominence cause salience or the reverse? In order to answer this question, models assuming different potential causal orders are estimated and their relative goodness-of-fit indices compared. A related research question addresses the stability of the focal identity as well as the stability of the relationship between prominence and salience. We ask, are identity prominence and salience, and their relationships, maintained over time?

We determine six hypotheses from these questions and address them by model fitting. The first two hypotheses test the stability of the two identity constructs, salience and prominence, from wave to wave (see Figure 1). Research on stability and change in self (Demo 1992) suggests that the self is relatively stable over time. Longitudinal data focusing on identity salience also support stability over time (Serpe 1987; Serpe and Stryker 1987, 1993). Merolla et al. (2012) suggesting that the focal identity should demonstrate relative stability in both prominence and salience over the waves of a panel study.

Hypothesis 1: Levels of identity prominence will remain stable, leading to strong positive associations between prominence measures across the three time periods.

Hypothesis 2: Levels of identity salience will remain stable, leading to strong positive associations between salience measures across the three time periods.

The next two hypotheses address Stets's (2006) question, reflecting the causal proposition of McCall and Simmons (1978) and the posited causal relationship of Stryker ([1980] 2003), linking the placement of an identity in the salience hierarchy to its placement in the prominence hierarchy. Stated simply, the more valued the identity, the higher the likelihood that the individual will wish to invoke it.

Hypothesis 3: The prominence of an identity is positively related to that identity's salience within each wave.

This hypothesis is stated in contradistinction to the reverse ordering (from salience to prominence) tested in the following hypothesis:

Hypothesis 4: A causal ordering from prominence to salience provides a better fit than the reverse ordering from salience to prominence within each wave.

The final two hypotheses reflect strong theoretical constraints in line with Hypothesis 4. These hypotheses allow for a stronger test of the assumptions of Nuttbrock and Freudinger (1991) and Brenner (2011, 2012). Unlike this prior work, the current study uses panel data and allows for the testing of more complex causal patterns. It may be that the assumption of unidirectional causality (from prominence to salience) is met within waves, but that a feedback effect from salience to prominence occurs between waves. The plausibility of this lagged effect is tested in Hypothesis 5:

Hypothesis 5: Lagged effects from prominence to salience in the following wave fail to differ from zero.

A second more complex pattern allows feedback effects from each construct to the other between waves. Comparing this model with that tested in Hypothesis 4 permits further testing of the assumption of unidirectional, within-wave causal relationships.

Hypothesis 6: A cross-lagged model with paths from prominence to salience in the following wave and from salience to prominence in the following wave will fit less well than a model with direct effects from prominence to salience.

DATA AND METHODS

Models are estimated using data from The Science Study, an ongoing national panel study following underrepresented college students in STEM fields. Study participants were recruited from universities with one or more of the following programs: Research Initiative for Scientific Enhancement (RISE), Minority Access to Research Careers (MARC), Undergraduate Student Training in Academic Research (U*STAR), and Bridges programs geared toward increasing minority students' engagement and success in these disciplines (Merolla et al. 2012; Schultz et al. 2011). The sample consisted of students who were enrolled in one of the science enhancement programs as well as students from each of the campuses who were not enrolled in a science enhancement program but exhibited the same characteristics of major, academic performance, interest in becoming a scientist, and so on as the students who were participating in science enhancement programs. Eligibility was limited to students enrolled in an undergraduate, graduate, or professional (e.g., medical school) program at the time of the screening interview in fall 2005.

These panel data are an excellent resource for the current study, providing a large enough sample size and good panel retention for longitudinal analysis. Panel members were asked to complete one online survey each semester.⁵ The screening interview (Wave 0) was fielded in the fall of 2005 with panel members resurveyed biannually (fall and spring semesters) beyond the initial wave. Three waves of data (Waves 1 through 3), collected in spring 2006, fall 2006, and spring 2007, are used in these analyses, providing a sample of 528 cases (out of 998 eligible respondents with three complete observations) for our analyses.

At the time of the screening interview, 10 percent were freshmen, 15 percent sophomores, 29 percent juniors, and 31 percent seniors; 16 percent were graduate or professional students. By Wave 3, 9 percent of respondents were freshmen or sophomores, 16 percent juniors, 37 percent seniors, 22 percent graduate or professional students, and 16 percent were no longer matriculated. Most respondents were under 25 (83 percent) at the time of the first interview; the average respondent age is 22.6 years ($SD = 4.1$).

The demographic profile of the analytic sample is very similar to that from the full sample (see Table 1 for descriptive statistics). The majority of the analytic sample is female (73 percent) and is comprised largely of racial and ethnic minority students: about half of the respondents are African American (45 percent) and about half Latino/a (42 percent). Both race and ethnicity (coded as three dummy variables: African American/black [reference category], Latino/a, and other race) and gender (dummy coded; female = 1) are included in these analyses as exogenous variables. Household income is included in nine categories in ten thousand dollar intervals. Finally, an indicator of parents' educational attainment (at least one parent with a bachelor's degree = 1) is included.

The diversity of this sample is a strength for the present purposes of testing aspects of identity theory. While we do not assert that this data set allows generalizability to a general population, it does, consistent with prior work, allow us to undertake a strong test of the

⁵A small number of surveys in each wave were administered by telephone interview, ranging from 3 percent in Wave 2 to 4.6 percent in Wave 1.

theoretical arguments presented here. Respondents to this survey have good reason to be engaged in the focal identity. More than 90 percent of respondents are women and ethnic or racial minorities pursuing a college degree (or more) in STEM fields in which they are underrepresented. Moreover, the science student identity is one that is not necessarily activated very often. Therefore, the expectation for the prominence-salience linkage is relatively small, yielding a conservative test of the hypothesis.

Models include eight manifest variables operationalizing the two latent constructs of interest, each measured using a preexisting scale adapted for the focal identity (Serpe 1987; Serpe and Stryker 1987; Stryker and Serpe 1982, 1994). The first latent construct—the salience of a science student identity—is measured using a four-question scale. Each item asks the student to reflect how certain he or she would be to mention his or her desire to be a scientist on meeting a person for the first time who fits into one of each of four categories: (1) a coworker, (2) a person of the opposite sex, (3) a friend of a friend, or (4) a friend of a family member. Each situation is rated on an 11-point scale measuring the likelihood that the respondent would tell the new person about his or her desire to be a scientist from 0 = “certain I would not” to 10 = “certain I would.” The items demonstrate excellent internal consistency, with Cronbach’s alpha ranging from .95 at times 1 and 2 to .96 at time 3.

The second latent construct—the prominence of a science student identity—is also measured using a four-item battery of questions. These items capture the prominence of the science student identity, as previously defined, by tapping into how the respondent conceives of himself or herself and his or her sense of what is central to his or her self-concept in this identity. Each item uses a five-point Likert agreement scale to measure the subjective value placed on the identity. The four items are:

1. Being a scientist is an important part of my self-image.
2. Being a scientist is an important reflection of who I am.
3. I have come to think of myself as a “scientist.”
4. I have a strong sense of belonging to the community of scientists.

The prominence measure demonstrates strong internal consistency: Cronbach’s alpha is .87, .84, and .88 at times 1, 2, and 3, respectively.

ANALYSIS

The purpose of our analyses is to understand the relationship between the prominence and salience of the respondent’s science student identity. To that end, a series of structural equation models are estimated using Stata 12 (sem) (see Figure 1).⁶ Fitting a model to three waves of panel data with relatively large sample sizes will likely lead to statistically significant chi-square values even for a known correct model (Loehlin 2004); therefore, model fit is evaluated using root mean square error of approximation (RMSEA) (Browne

⁶Identical models were estimated in LISREL 8.8. No differences emerged between estimates. Negligible differences emerged between goodness-of-fit statistics, none large enough to change findings presented here.

and Cudeck 1993), and alternative models are compared using Bayesian Information Criterion (BIC) (Raftery 1995), in addition to the likelihood ratio chi-square.⁷

The first two models test the two causal orderings reflected in the hypotheses. Model 1 offers the first of two simple explanations, testing the association between prominence and salience proposed by McCall and Simmons (1978) and Stryker and Serpe (1994) and restated in Hypothesis 3. This model predicts that salience at each of the three time points is a function of prominence in the current wave and salience in the previous wave (except at time 1 when there is no prior wave). Prominence in the current wave is predicted to reflect only prominence in the prior wave.

Model 2 offers the second of two simple explanations. It tests a potential alternative to the relationship between these concepts proposed by the first model, namely, that the likelihood of enacting an identity impacts the value attached to that identity. This model tests Hypothesis 4. Accordingly, salience in the current wave is predicted only as function of salience in the prior wave.

The last two models test more complex but plausible sets of paths. Model 3 expands on the first model, returning to the hypothesized causal relationship between prominence and salience, but also allowing salience in the current wave to influence prominence in the following wave, as proposed in Hypothesis 5. Model 4 tests a cross-lagged panel design, including lagged effects from salience in the current wave to prominence in the following wave and from prominence in the current wave to salience in the following wave. This final model tests Hypothesis 6.

Each model estimates an identical measurement model and error covariance structure and includes race and ethnicity, gender, income, and parental education as exogenous variables. The manifest variables for prominence in the current wave are constrained to load only on the prominence latent construct in the current wave, and the manifest variables for salience in the current wave are constrained to load only on the salience latent construct in the current wave. Manifest variable errors are allowed to correlate with the error of the same variable in prior and successive waves and the errors of other manifest variables loading on the same construct in the same wave. No other factor loadings or error correlations are estimated, and no changes in the error covariance structures are made between models.

RESULTS

Model 1 estimates the direct effect of prominence on salience within each wave. The model also allows each latent construct to directly affect the same latent construct in the following wave. Even though it has a relatively simple structure, Model 1 fits well. RMSEA (.041) is below the .05 threshold and BIC is large and negative (-1,477). As expected, chi-square is statistically significant (see Table 2).

⁷RMSEA, the root mean square error of approximation, is an absolute measure of fit. Values of RMSEA less than .05 are considered to be evidence of good model fit. BIC, the Bayesian Information Criterion, is a parsimony-adjusted goodness of fit index. BIC accounts for model complexity by severely "penalizing" for each estimated parameter. The model with the smallest value of BIC is preferred.

Manifest variables load on their intended constructs as anticipated. Factor loadings for prominence are similar in value and range across the three waves, from: .73 to .82 at time 1, .68 to .78 at time 2, .73 to .87 at time 3 (see Figure 2 and Table 3 [found in an online appendix at www.asasnet.org/journals/spq]). Factor loadings vary little across manifest variables and waves for salience, ranging from .90 to .91 at time 1, .88 to .92 at time 2, and .91 to .93 at time 3. As expected, changes in these factor loadings between models are negligible and are therefore not discussed further.

Four exogenous controls are included in this model, each prior to the prominence and salience constructs at time 1. The coefficients of three variables—gender, household income, and parental education—are negligible and fail to reach conventional levels of statistical significance. The final control, race and ethnicity, is included here as a set of two dummy variables (Latino/a and other race) compared to a third (African American/black). In Model 1, Latino/as rate their prominence slightly higher than African Americans (.17), this coefficient reaching conventional levels of statistical significance. Few changes arise in subsequent models (the only change in coefficients is for Latino/as' rating of salience, which rises to statistical significance in subsequent models). Consequently, these exogenous control variables will not be discussed further.

The model demonstrates the significant, positive effects of prominence and salience on subsequent measures of each construct. Effects of the prior wave on the current rating of prominence are large (.71–.75) and statistically significant. The effects of prior salience on subsequent salience are also positive and moderately large (.27 and .44) and reach statistical significance.

Large direct effects between current wave prominence and salience emerge, .63 at time 1, .56 at time 2, and .47 at time 3, suggesting a strong direct link between the prominence of an identity and its salience at the time of measurement.

Further post hoc adjustments based in the modification indices in the statistical software could be made to this model to reduce chi-square and improve overall fit. However, as these adjustments could lead to an overfitting of the model to these data harming model parsimony, as well as to the estimation of illogical and clearly erroneous negative paths (e.g., a causal arrow pointing backwards in time), they were not included. As the RMSEA suggests it fits reasonably well, Model 1 is retained and compared to alternative and more complex models.

Model 2 tests an alternative causal hypothesis replicating the first model except reversing the paths between prominence and salience at each time (see Figure 3). While this model fits well (RMSEA = .044), comparison to Model 1 demonstrates a significantly poorer fit ($\Delta\chi^2 = +45$; $\Delta\text{BIC} = +45$) at the same number of degrees of freedom. Model 1 fits these data more clearly and is therefore retained. Importantly, this is the first step in establishing that the stronger direction of the relationship is from prominence to salience for our data. Given this finding, subsequent models are estimated with the assumption that the best fitting causal ordering for this data is from prominence to salience.

Model 3 introduces two changes to the causal ordering from Model 1 (see Figure 4). First, the lagged effects of salience to prominence in the following wave are estimated. Second, the two latent constructs of prominence and salience are modeled as correlated at time 1, rather than causally related.⁸ This model also fits well (RMSEA = .041) and negligibly better than Model 1 ($\Delta\chi^2 = -5; -2 df$). However, the coefficients for each of the two crossing paths are small (.10 and .06), and neither rises to conventional levels of statistical significance. The negligible improvement in fit, illustrated by the minimal decrease in chi-square, is not significant at the cost of two degrees of freedom ($\Delta BIC = +7$). While this model contributes to the evidence supporting the causal ordering of prominence to salience, the more parsimonious Model 1 is retained.

Model 4 presents a model with cross-lagged effects: direct effects from salience to prominence in the following wave and from prominence to salience in the following wave, as well as direct effects from each latent construct to the same latent construct in the following wave (see Figure 5). Unlike previous models, Model 4 does not include direct cross-sectional effects (i.e., both at the same time) between prominence and salience. Both paths from salience to prominence are small (.08 and .11), and only one (from Wave 2 to Wave 3) reaches conventional levels of statistical significance. The two paths from prominence to salience are equivalent and moderate in size (.28 and .32) and statistically significant. RMSEA is slightly above the .05 threshold (.054), suggesting an acceptable, but not great, fit. Significant increases in χ^2 and BIC ($\Delta\chi^2 = +208, 2 df; \Delta BIC = +221$) suggest the full cross-lagged Model 4 fits less well than Model 1, which is retained. The pattern of coefficients estimated in Model 4 lends additional support to the direction of the causal relationship of prominence to salience.

Summary of Findings

Model fitting and comparison argues that the simplest and most parsimonious model, Model 1, is preferred, supporting all stated hypotheses. This model demonstrates a strong and positive effect of prominence from prior waves on prominence in subsequent waves, in line with Hypothesis 1. A similar, although somewhat attenuated, effect of salience from prior waves on salience in subsequent waves supports Hypothesis 2. These first two findings illustrate the stability of the prominence and salience of the focal science student identity over time. The strong, positive effect of prominence on salience across all three waves lends support to Hypothesis 3. Taken together, these three findings signify a strong stable pattern: a highly prominent science student identity leads to a highly salient science student identity within the same wave as well as higher prominence and salience of the identity in the following wave.

This relatively simple model compares well to alternatives. A similar model (Model 2) fitted with reversed paths (from salience to prominence) did not fit as well and was rejected, supporting Hypothesis 4. Moreover, cross-lagged paths (Model 3) from salience to prominence in following waves yielded negligible coefficients that did not rise to conventional levels of significance. Failing to show a significant improvement in fit, this

⁸This change results in no difference in model fit to one with a causal path from prominence to salience. The sizes of the causal path and the correlation are identical. This change is made to prepare for the introduction of Model 4.

model was rejected in line with Hypothesis 5. Finally, a cross-lagged model from salience to prominence in following waves in addition to paths from salience to prominence in following waves (Model 4) fit less well compared to the baseline model with direct effects from prominence to salience. This finding supports Hypothesis 6. This final model elucidates the directionality of the causal impact of prominence on salience as hypothesized. In the absence of direct, cross-sectional effects, the cross-lagged effects from prominence to salience are moderately large and significant. However, the other set of cross-lagged effects from salience to prominence are negligible in size and not statistically significant. These findings support Hypothesis 6.

Taken together, these findings have two major implications. First, they establish and support the case for a causal ordering from identity prominence to identity salience in the instance of a science student identity. The significantly better fit of the simple baseline model (Model 1) compared to the reverse order model (Model 2) and the small, nonsignificant crossing paths from prior salience to subsequent prominence in Models 3 and 4 make this case strongly. Second, the preferred model with direct cross-sectional effects from prominence to salience demonstrates the stability of the hypothesized effect and establishes a clear time-dependent causal ordering in our data.

DISCUSSION

This study tested the causal order of two key concepts in identity theory: identity prominence and identity salience. A series of alternative models were fitted to three waves of data from a panel study of science students from 48 colleges and universities, focusing on the respondent's identity as a science student. Findings provide clear support for the conclusions that prominence precedes salience in the case of a science student identity and that this relationship is maintained over an 18-month period.

This hypothesized causal ordering, giving priority to the affective dimension as precedent, supports Cooley's (1902) treatment of self by incorporating persons' affective responses in a way Mead (1934) does not. This finding—that the subjective value of the identity precedes its performance—is important as it may inform not only future research on identity theory and in social psychology more generally, but also research more focused on social policy and program implementation. A better understanding of this relationship may be useful for models focused on predicting behavior, namely, predicting voting likelihood (“likely voter models”), giving to a fundraising campaign, or participation in a community event. This understanding may also benefit programs and intervention strategies focused on strengthening the individual's affective linkage to a socially beneficial focal identity and may more effectively achieve their goals of increasing the propensity to perform a given identity, and thus promote its resultant behavior, namely, promoting healthy behaviors like physical exercise or a nutritious diet, encouraging volunteering at or participation in civic event, or identifying individuals' voting likelihood to maximize efficaciousness of “get out the vote” campaigns.

While we find a strong correlation between prominence and salience in these data for the specific identity of a science student, we expect that the direction and magnitude of the

association between prominence and salience may vary substantially for other identities. In some cases, the relationship may be nonsignificant. Other cases may encounter artificially inflated correlations due to social desirability bias, as highly prominent but rarely enacted identities are rated highly salient in the context of a survey interview or on a self-administered questionnaire (Brenner 2011, 2012). In these settings, outside of the constraints of more typical forms of interaction (Schaeffer 1991), individuals can bring the report of an identity's salience into concordance with its prominence (Burke 1980), aligning the actual, ought, and ideal of the focal identity (Higgins 1987) in the survey report. In still other cases, under some perhaps rare circumstances, the causal relationship demonstrated here may be reversed, namely, that salience will cause prominence. This might occur when the affect attached to interactants' identities are at an absolute minimum, as with a deviant or stigmatized identity, for example, an HIV-positive individual or an ex-con. As these exceptions suggest, contextual aspects of an identity and its enactment may promote differential levels of association between salience and prominence and may ultimately influence their causal relationship.

Given the differences in the correlations of prominence and salience, it is necessary to understand that these concepts may, under some contexts, be highly correlated and therefore theoretically redundant. In other contexts, the correlations may be greatly reduced, and therefore the two constructs should not be used interchangeably. The potential sources of such variation may be many. More constrained identities (Serpe 1987) or those exhibiting greater levels of obligation or less choice in their enactment in given contexts (Thoits 2012) may demonstrate closer locations in the prominence and salience hierarchies. Conversely, when identities are less obligatory and constrained and when participation is voluntary and characterized by more choice, the correlation between prominence and salience may be lower because there are fewer social structural constraints on entering and exiting an identity and on how an identity is enacted.

Alternatively, given a relatively unconstrained, voluntary identity, we may expect to find relatively higher correlations between prominence and salience, as the individual more strongly values and frequently enacts the identity he or she has chosen. Overzealous religious converts (Festinger, Rieckin, and Schacter 1956) and rabid sports fans are paradigmatic illustrations of this potential. Stryker and Serpe (1994) described more typical examples, finding correlations of about .60 between prominence and salience for two voluntary identities—extracurricular and athletic identities—in a sample of university students. Conversely, the ascribed or assumed identity may be less valued, even if it is often enacted, leading to a divergence between its placement in the salience and prominence hierarchies. For example, Stryker and Serpe (1994) find relatively lower correlations between prominence and salience for personal involvement identities (.15) and academic identities (.10).

It may be tempting to believe that the causal relationship from prominence to salience is universal, perhaps even based in evolutionary processes. Haidt (2007, 2012) links Zajonc's (1980; Zajonc and Markus 1984) contention that cognitions reflect an emotion-based response as an antecedent to contemporary evolutionary neurology, referencing Damasio's (2010) argument that the emergence of self in human behavior was enabled by evolutionary

developments in the brain stem.⁹ Thus, the affect/emotion, central to the prominence of an identity, precedes behavioral expression of the identity. However, this argument fails to acknowledge important situational differences like those previously discussed, as well as variation in forms of identity—a person identity or a social identity—that may potentially alter the commonality of prominence and salience. More specifically, we would expect the greatest variation in prominence and salience will hold in role identities, with greater congruence between prominence and salience in person and group identities (Burke and Stets 2009; Stets and Serpe 2013).

In short, it is essential that researchers consider both the type of identity and the contextual social setting when attending to the concepts of prominence and salience for both empirical and theoretical explanations. Therefore when both measures are present, we recommend using both. When only one of the two measures is available, we argue that the researcher should consider the type of identity and contextual nature of the identity in both using and interpreting the results with respect to the impact of prominence or salience. When both measures are present, we continue to believe, in line with our research findings, that the general causal ordering is mostly likely to be prominence to salience.

FUTURE DIRECTIONS AND CONCLUSIONS

Limitations of the sampling frame and the study design present excellent opportunities for future research. The entire time period of data used here covers about 18 months (i.e., spring 2006 to spring 2007, including an interim measure in fall 2006). Extending these analyses to a longer period of time may show changes in the effects at later measurements. As the purpose of this paper was to look at the relationship between prominence and salience rather than the long-term maintenance or dissolution of a science student identity, this relatively brief reference period suffices. Future research may find such a longer view useful.

While we have argued that the diversity of this sample is a strength given our purposes of theory testing, we have also noted that the identity measured (as a science student) in the observed sample (ethnic and racial minority students majoring in STEM fields) may not be readily generalizable to other identities and populations. Moreover, other types of identities may require measurement and modeling over different time frames, given the duration, nature, and stability of the identity. Some identities are clearly longer lasting than others. A science student identity is relatively brief compared to the potential scientist identity to which it leads. Clearly, future research is needed to test the external validity of these findings, extending this research to other types of identities along different typologies such as those highlighted in the discussion (i.e., role, social, and personal identities; ascribed vs. achieved identities).

⁹Many psychological cognitive social psychologists see Zajonc's (1980, Zajonc and Markus 1984) argument as unwarranted and unacceptable (see e.g., Lazarus and Folkman 1984). Zajonc's argument that all persons' cognition, including reasoned responses, are influenced by a preceding affective prompt has led to a spate of research by cognitive social psychologists detailing the negative impact of self variables on social behavior. Perhaps the first such work was that of Festinger, Rieckin, and Schacter (1956). Representative of this body of work are papers by Leary (2002) and Baumeister, Smart, and Boden (1996). Today, we find this argument in everything from the *New Yorker* magazine (Bloom 2013) to the *New York Times* (Tugand 2013).

A number of important components of identity theory and related concepts have been excluded from the analyses in the present paper but could be more fully investigated in future research. First, identity theory has generally treated prominence, psychological centrality, and importance as a single construct. While these constructs are highly related, each was independently developed from a different theoretical perspective. As such, their propositions involve subtle but critical distinctions. Future work should address the theoretical mappings of these constructs to distinguish both their commonality and distinctness. Second, identity commitments play an integral role in identity formation and maintenance in structural identity theory. These models could be extended to include affective and interactional commitments as precedents or causes of salience and prominence, potentially altering the causal relationship hypothesized here. Third, the impact of verification of an identity could influence the relationship between prominence and salience. Therefore the inclusion of identity discrepancy from the perspective of perceptual control systems (Tsushima and Burke 1999) could prove to be useful as well. Future work will integrate commitments, verification, and cognitive assessments of self, as well as behavioral outcomes into the models.

Similarly, feedback resulting from role-relevant social interaction can increase the individual's sense of "mattering" (Rosenberg and McCullough 1981). That another individual matters implies an affective response to that individual, impacting both self-esteem and the prominence of the focal identity. It may be that variation in the "mattering" attached to an identity (Rosenberg and McCullough 1981) will promote the congruence of identity prominence and salience, with greater congruence holding when an identity "matters" more. More research is needed to test these conjectures, especially given the dearth of empirical research on prominence and its role in identity theory.

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Biographies

Philip S. Brenner is an assistant professor of sociology and senior research fellow in the Center for Survey Research at the University of Massachusetts, Boston. His current research investigates identity processes in survey data collection. His work has recently appeared in *Social Forces*, *Public Opinion Quarterly*, *Social Indicators Research*, and the *Journal for the Scientific Study of Religion*.

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Sheldon Stryker is distinguished professor of sociology emeritus at Indiana University. A career-long contributor to the literature on social psychology focusing in particular on the symbolic interactionist frame and on identity theory, he has received the American Sociological Association DuBois Award for Lifetime Distinguished Contributions to Sociology, the ASA Social Psychology Section Cooley-Mead Award for Lifetime Contributions to Social Psychology, the Society for Symbolic Interaction George Herbert Mead Award for Lifetime Contributions, and the International Society for Self and Identity Lifetime Achievement Award.

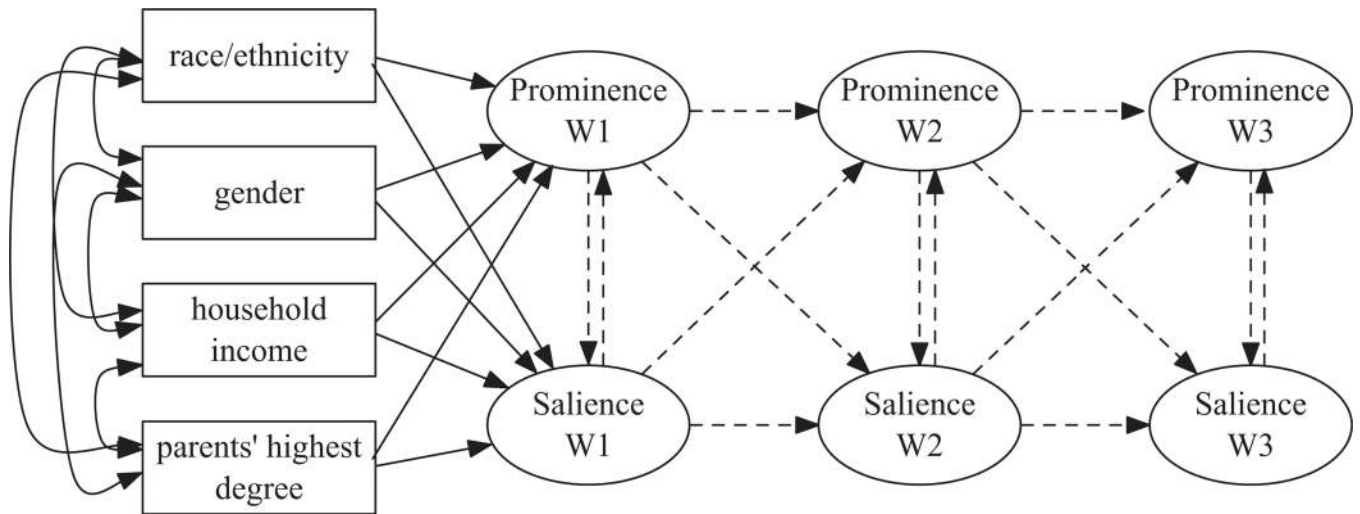


Figure 1.
 Heuristic Structural Model of the Tested Hypotheses
Note: Broken lines represent the various tests of hypotheses.

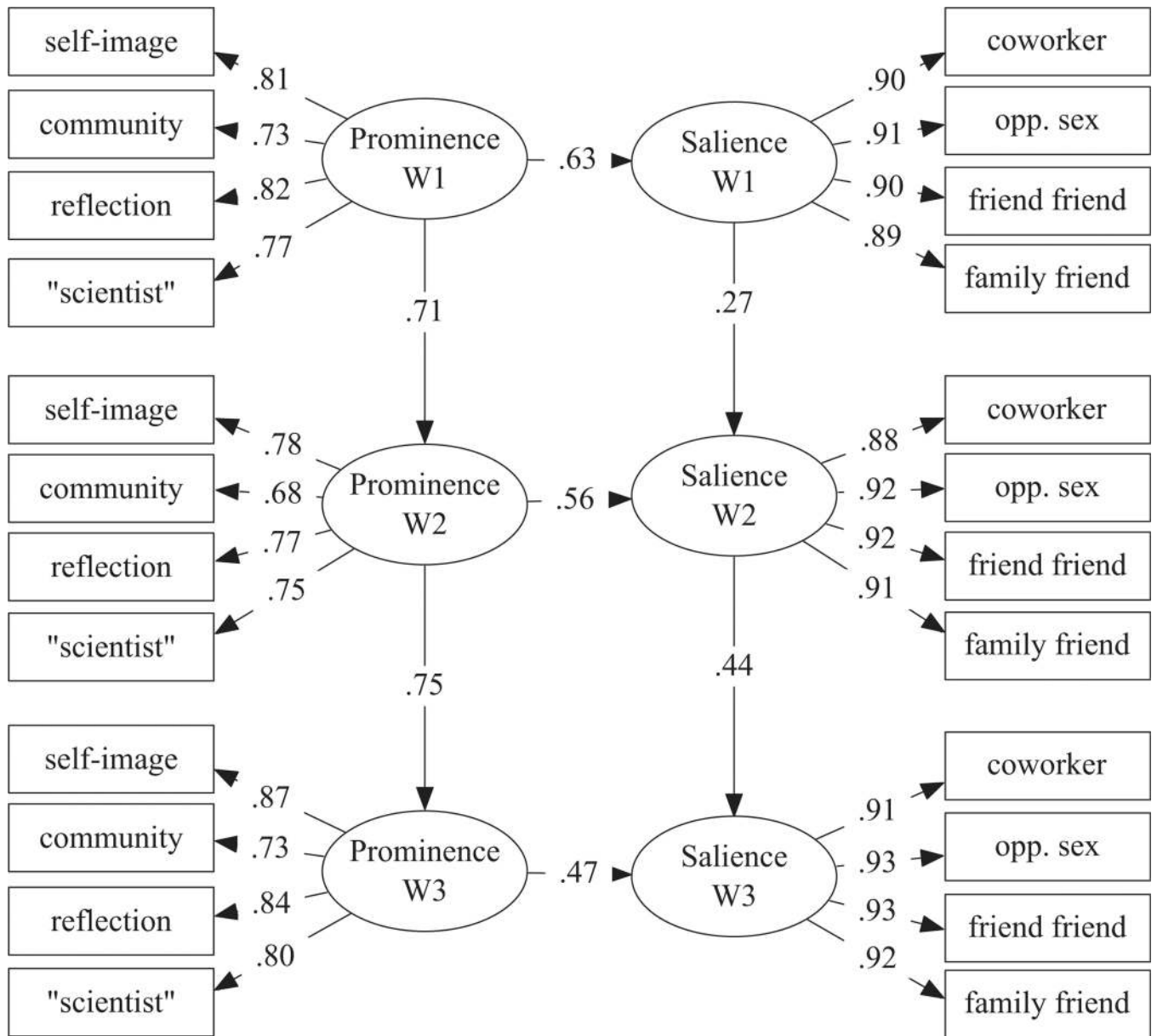


Figure 2.
Model 1: Salience Predicted by Prominence

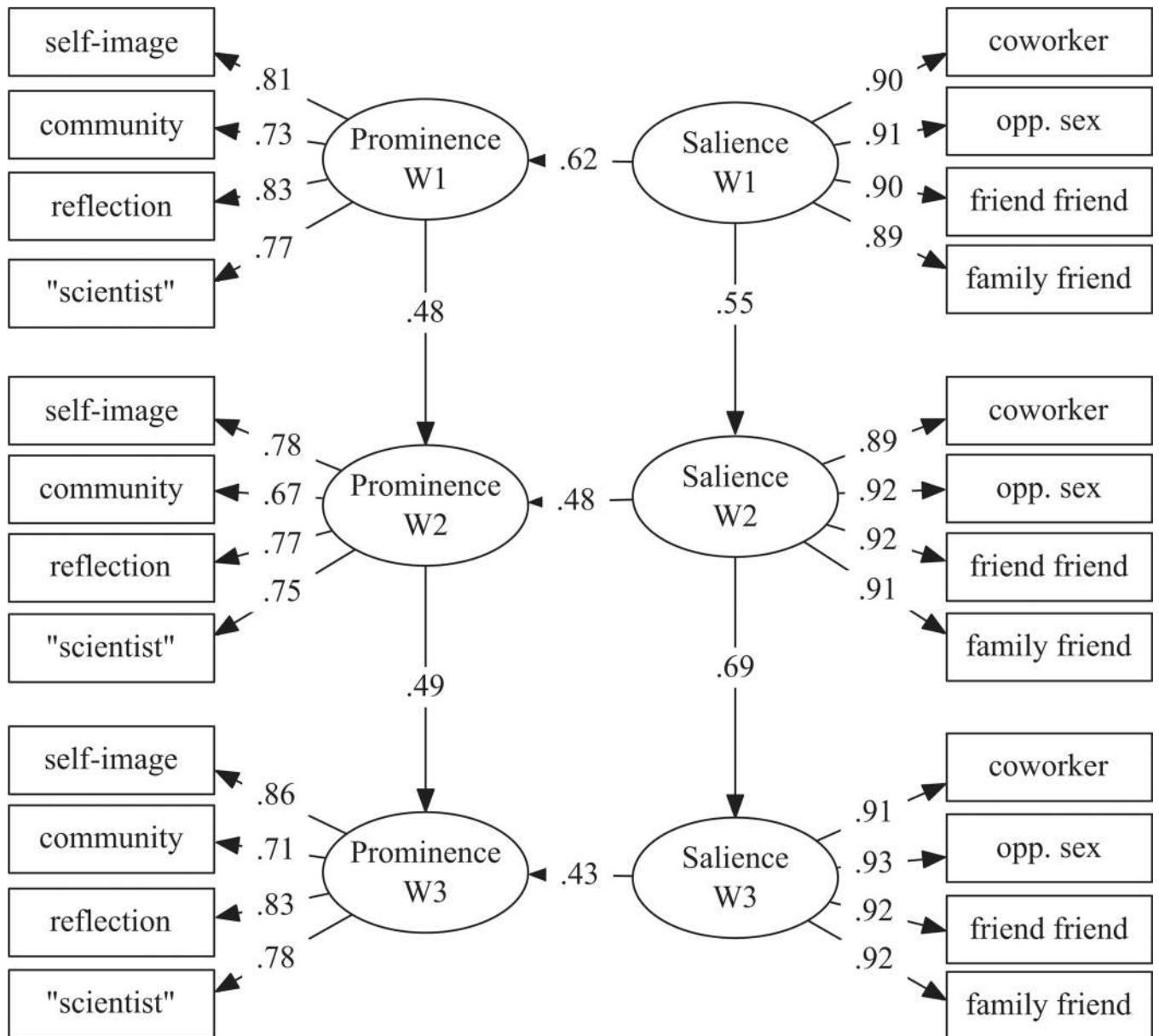


Figure 3.
Model 2: Reverse Causality; Prominence Predicted by Saliency

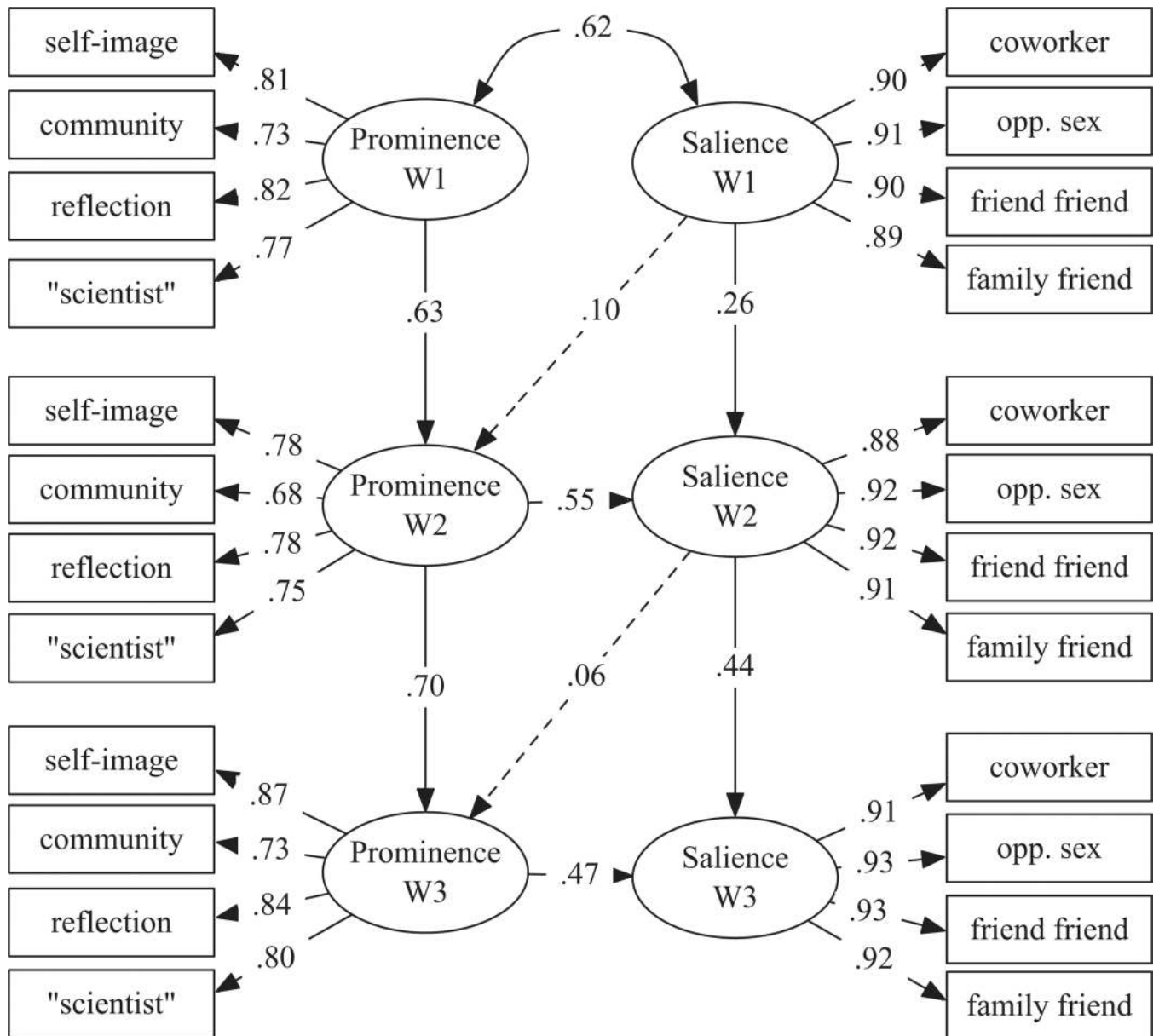


Figure 4.
Model 3: Salience Predicted by Prominence, Partial Cross-Lagged Model

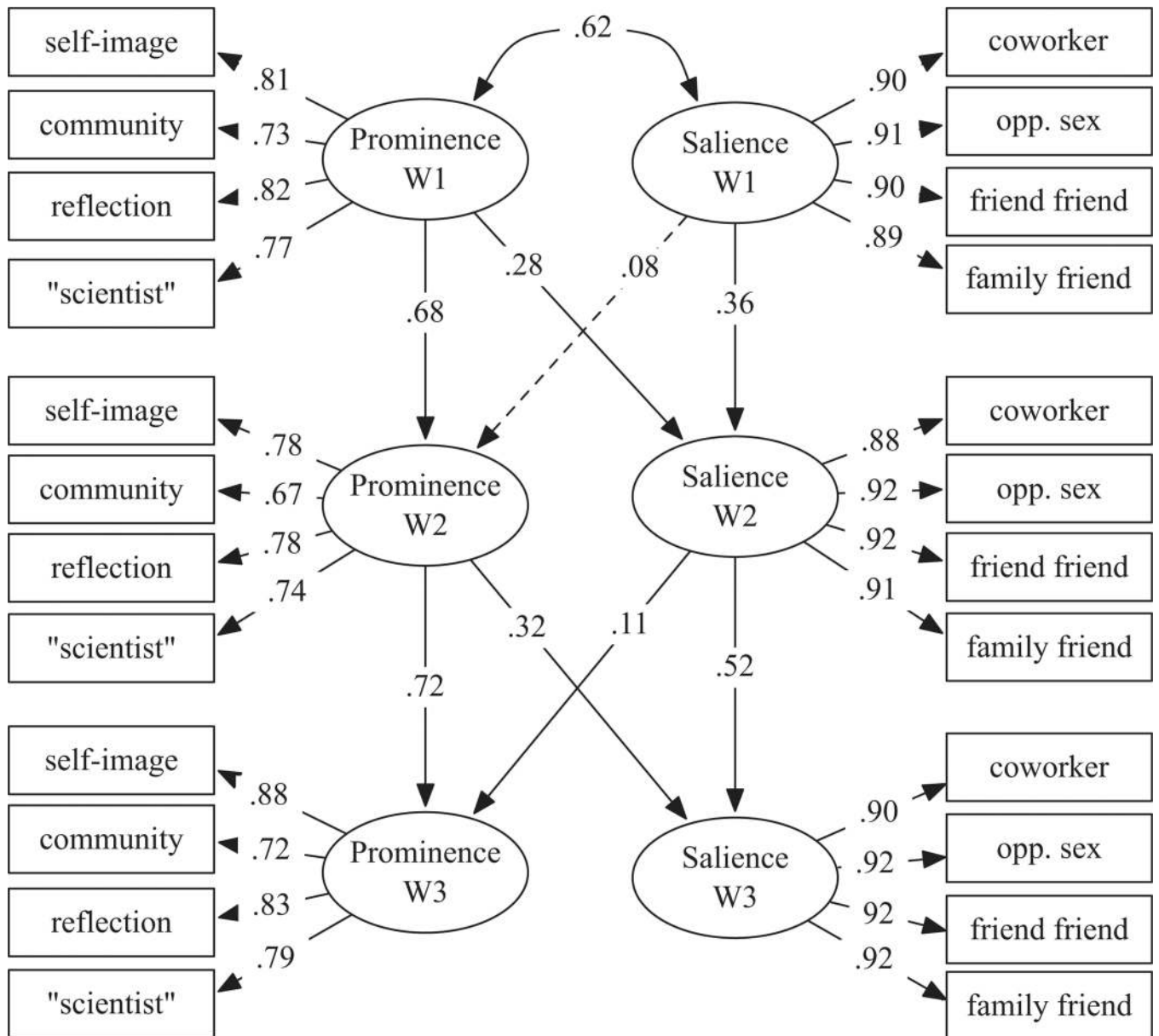


Figure 5.
Model 4: Salience Predicted by Prominence, Full Cross-Lagged Model

Table 1

Descriptive Statistics: Proportions/Means and (Standard Deviations)

	Wave 0	Wave 1	Wave 2	Wave 3
Sex				
Male	73.3			
Female	26.7			
Race/ethnicity				
African American/black	44.7			
Asian	4.4			
Hawaiian/Pacific Islander	2.3			
Latino/Latina/Hispanic	42.4			
Native American/Alaskan Native	1.6			
White, non-Hispanic	4.6			
Age	22.6 (4.1)			
Has parent with bachelor's degree	50.1			
Income				
Less than \$10,000		19.1		
\$10,000 to \$19,999		15.5		
\$20,000 to \$29,999		16.5		
\$30,000 to \$39,999		10.6		
\$40,000 to \$49,999		11.7		
\$50,000 to \$59,999		7.2		
\$60,000 to \$69,999		4.9		
\$70,000 to \$79,999		3.4		
\$80,000 or more		11.2		
Prominence				
Important part of my self-image		3.43 (1.15)	3.42 (1.17)	3.55 (1.19)
Important reflection of who I am		3.40 (1.02)	3.49 (1.03)	3.57 (1.09)
Think of myself as a "scientist"		3.71 (1.07)	3.73 (1.08)	3.75 (1.11)
Strong sense of belonging to the community of scientists		3.54 (1.11)	3.66 (1.10)	3.77 (1.14)
Saliency				
Meeting coworker		7.33 (2.60)	7.36 (2.60)	7.44 (2.60)
Meeting person of opposite sex		7.17 (2.72)	7.15 (2.70)	7.33 (2.59)
Meeting friend of a friend		7.27 (2.68)	7.23 (2.57)	7.41 (2.58)
Meeting friend of family member		7.50 (2.63)	7.41 (2.54)	7.58 (2.55)

Table 2

Model Comparison

Model	N	χ^2	df	Bayesian Information Criterion	Root mean square error of approximation
1. Direct cross-sectional effects	528	635.48	337	-1.477	.041
2. Reverse causation	528	680.51	337	-1.432	.044
3. Reverse lagged effects	528	630.05	335	-1.470	.041
4. Cross-lagged effects	528	843.89	335	-1.256	.054