Communication is Key:

Sectoral Diversity and Unity in Substance Abuse Prevention Coalitions

by

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Communication is Key:

Sectoral Diversity and Unity in Substance Abuse Prevention Coalitions

Substance misuse in the United States is an epidemic-level issue. In 2021 alone, 46.3 million people aged 12 or older (16.5%) reported having a substance use disorder within the past year, and 60 million people aged 12 or older (45.1%) reported binge drinking within the past month (Substance Abuse and Mental Health Services Administration, 2022). The state of Tennessee specifically has an unusually high overdose death rate from substance abuse compared to other U.S. states, and even saw a 50% increase in the overdose death rate between the years of 2015-2019 (Pellegrin, 2021). One of the strategies that communities employ to address substance misuse is the formation of substance abuse prevention coalitions. Coalitions have been proven to prevent public health issues such as substance misuse and represent one of the most effective strategies for achieving community change (CDC, 2008; Feinberg et al., 2010; Hawkins et al., 2009). Communities in Tennessee utilize coalitions as a strategy to tackle the mounting issue of substance abuse: state-funded substance abuse coalitions are present in approximately half of Tennessee's geographical counties and in 85% of the counties with the highest rates of overdoses (*Data Dashboard*, n.d.).

Within coalitions, it is widely assumed that having more sectors is better for coalition processes – the handbook for the Community Anti-Drug Coalitions of America (CADCA) National Community Anti-Drug Coalition Institute lists 12 required sectors that must be represented within coalitions to receive federal grants (National Community Anti-Drug Coalition Institute, 2004). Although this is considered best practice, there is no evidence that increasing sectors within a coalition leads to better outcomes. Additionally, one of the primary purposes of coalitions is to utilize collaborative methods to achieve community change (Centers for Disease

Control and Prevention, 2008). Despite coalitions' popularity as an approach, research on how coalition processes affect their outcomes is limited.

This thesis was designed to explore coalition processes that could be modified to influence a coalition's outcomes. Drawing on Kurt Lewin's (1946) framework of action research, I worked with the Tennessee Department of Mental Health and Substance Abuse Services (TDMHSAS) to create a study with both generalized scholarly findings for coalitions overall and actionable insights for the specific coalitions involved in the study. The data were collected across 40 counties in partnership with TDMHSAS, offering a valuable statewide source of information. The coalition processes targeted for this study were sectoral diversity, coalition unity, coalition members' shared philosophy, and coalition communication. By exploring and reporting on these four measures, this thesis will provide coalitions with actionable ways to improve their work, increasing their chances of impacting the substance abuse epidemic and achieving positive community change.

To do so, I first provide a scientific literature review to lend context and theory to the measures utilized in the study. I then outline the methods through which the data were collected and the approach that was taken in data analysis. Results of the data analyses are provided along with a discussion of implications, limitations, and potential future research.

Literature Review

Collaboration allows individual people or entities to accomplish far beyond what they could do themselves. When organizations collaborate, it changes the way they work together by encouraging consensus, widening goals, and diversifying ideas, activities, and strategies (Butterfoss, 2007). These partnerships, whether formal or informal, pool together resources and pursue shared goals that seek to benefit all involved parties. In addition to providing personal or

organizational benefit, collaboration also represents a key element of social problem-solving efforts (Chavis, 2001). One such example of this can be found in coalitions, which are formal, long-term collaborations composed of various individuals, organizations, and sectors that work together to achieve a common goal (Feighery and Rogers, 1990). Coalitions leverage resources to mobilize communities – they are action-oriented, versatile, and serve as one of the most effective strategies for achieving community change (Centers for Disease Control and Prevention, 2008). Community coalitions are also proven to prevent public health problems and reduce delinquency, crime, and substance misuse in the communities they are implemented in (Feinberg et al., 2010; Hawkins et al., 2009).

The success of coalitions in achieving community change and preventing public health problems can be partially attributed to the nature of collaboration itself, but there are many other factors that contribute to coalition effectiveness and survivability. Funding plays a part in coalition success, however, even when accounting for funding, successful coalition functioning influences the survival of a coalition more than most other factors (Feinberg et al, 2008). According to Brown et al. (2012), "there is no single dominant theoretical framework for understanding the critical aspects of coalition functioning" (p. 2). This thesis draws from the coalition functioning framework found in the Community Coalition Action Theory (CCAT) conceptual model. The full CCAT conceptual model can be found in **Figure 1**.

An important aspect of coalition functioning is to have a clear mission or guiding purpose, as it fosters cohesiveness and effectiveness (Butterfoss, 1993, p. 320). A clear mission gathers people under a common banner and provides a shared path for moving forward, allowing coalition members to work together more effectively. This shared purpose can be defined by the coalition board or by the coalition membership, but regardless of the defining process, continued

investment in the mission requires relationship building and communication between all coalition members. Indeed, good relationships within a coalition not only impact coalition functioning but are critical to the success of a coalition (Foster-Fishman et al., 2001). According to Christens (2010), positive relationships within organizations build grassroots power and represent a key strategy in enacting community change, making them a core tenant of effective collaboration. The extent to which coalition staff and members interact and work together towards a common goal is key to a coalition's continued success.

Collaboration of various individuals naturally provides diverse opinions, and an important consideration specific to coalitions is the number of diverse actors a coalition has, also known as sectoral diversity. Sectoral diversity is specifically defined in this study as the extent to which a coalition has representation from various sectors within a community (i.e., youth, healthcare, religion, education, government, etc.). Sectoral diversity has the potential to harness differing skillsets, resources, and perceptions to improve a coalition's ability to map out community resources/needs, develop a shared mission, create effective solutions, and garner the resources and support needed to enact change (Foster-Fishman et al., 2001; Butterfoss & Kegler, 2012, p 321). The positive effects on coalitions accompany improved health benefits for the communities being served, with greater diversity leading to mobilization that sustainably improves healthy environments and disease prevention efforts (Chaisson et al., 2022). The more sectoral diversity a coalition has, the more community representation there will be, increasing the likelihood that the coalition will meet the needs of the community.

Although diversity is necessary and promotes various positive outcomes within groups, it also has the potential to present challenges with organizing, forming shared understanding, developing trust, and finding favorable solutions (Ostrom et al., 1999). On a coalition level,

sectoral diversity can produce similarly negative effects along with increasing the division between groups or sectors, hampering coalition building, and decreasing cohesion amongst coalition members (Daphi et al., 2019). According to Chavis (2001), "the different interests, history, and power of participants create a more complex setting than any other type of community organization" (p. 310). The complex convergence of differing tools, systems, mindsets, resources, and life experiences can cause coalition members to stumble rather than thrive, leading the coalition to potential failure in its collaborative pursuit.

How can coalitions receive the positive effects of necessary diversity within their membership without sacrificing unity and efficiency? Brown et al. (2017) claims that building representation and diversity within the coalition is merely the beginning, and coalitions must facilitate and encourage intersectoral communication to truly reap the benefits of that diversity. Indeed, Lasker et al. (2001) agrees that the most successful coalitions are those that not only have diverse membership but also promote interaction amongst their diverse members and make use of the varied resources offered by the coalition membership. Through encouraging communication and interaction between differing group members and sectors, coalitions can work together more effectively and harness the unique perspectives and resources of their members to create more meaningful change.

The Current Study

This study seeks to examine the effect of sectoral diversity within Tennessee's state-funded substance abuse prevention coalitions on the like-mindedness and cohesion of coalition members, specifically when accounting for communication within the coalition. Each of the hypotheses for this study examines a different set of variables and the role of communication in

moderating the effect between those variables. The theoretical models for this study are found in **Figure 2.**

As previously mentioned, this thesis draws upon the CCAT framework. The CCAT proposes that there is a relationship between coalition membership and coalition processes that in turn affects a coalition's ability to enact community change (Butterfoss & Kegler, 2002). Coalition membership can be operationalized in many ways; in this thesis, it is operationalized through measures of sectoral diversity, members' convergence on their perceptions of the causes of substance abuse (a shared philosophy), and coalition communication. Coalition processes are operationalized through coalition unity. By examining these relationships, I am testing the following specific propositions from the CCAT: "*Proposition 8*. More effective coalitions result when the core group expands to include a broad constituency of participants who represent diverse interest groups, agencies, organizations, and institutions. *Proposition 9.* Open and frequent communication among staff and members helps to create a positive organizational climate, ensures that benefits outweigh costs, and makes pooling of resources, member engagement, and effective assessment and planning more likely" (Butterfoss & Kegler, 2002, p. 164).

Overall, prior evidence seems to suggest that sectoral diversity by itself can lead to challenges forming shared understanding within a coalition (Ostrom et al., 1999). Thus, the first part of hypothesis one is that *H1a:* as sectoral diversity increases, convergence between members on the perception of the causes of substance abuse in the community decreases. Facilitating communication within a coalition has been found to mitigate the discordant effects of diversity (Brown et al., 2017), leading to the second part of hypothesis one that *H1b:* increased coalition communication both among coalition members and between coalition staff and members will

moderate the negative effects of sectoral diversity, leading to higher levels of convergence on perception of the causes of substance abuse.

Previous research also shows that a lack of shared understanding within a community coalition can lead to a decrease in unity and trust between members (Ostrom et al., 1999; Daphi et al., 2019), leading to hypothesis two that *H2***:** as convergence on the perception of the causes of substance abuse decreases, coalition unity also decreases.

Given the first two hypotheses, it is also hypothesized that *H3a:* as sectoral diversity increases, coalition unity decreases. Prior research has also shown diversity to have positive effects when there is improved communication within a community coalition (Lasker et al. 2001). Thus, the third hypothesis will also be moderated by coalition communication, hypothesizing that *H3b:* increased coalition communication both among coalition members and between coalition staff and members will moderate the negative effects of sectoral diversity, leading to higher levels of coalition unity.

Methods

Participants and procedures

The data for this study were collected in 2019 via an online survey by a workgroup comprised of university researchers, state public health officials, and independent evaluators. The survey was taken by 531 participants in 40 county-level state-funded substance abuse prevention coalitions in the U.S. state of Tennessee. All participating coalitions received their funding from the Tennessee Department of Mental Health and Substance Abuse Services through a federally funded block grant for substance abuse prevention; survey results were anonymous in nature and had no impact on future funding of the coalitions. Prior to distribution, the survey was piloted with three initial coalitions and included items “designed to assess

coalition activities, strategies, internal processes, and capacity" (Christens et al., 2021, p. 4). Directors from the three coalitions were given preliminary analyses and then consulted with regarding the survey, providing feedback for adding, removing, or modifying survey items and verbiage. After being updated, the survey was distributed to the remaining coalitions via coalition directors to their members. The survey's intent was to "assess capacity and to identify opportunities for training and technical assistance" (Christens et al., 2021, p. 4).

The 40 participating coalitions were in various counties across Tennessee, which contains 95 geographic counties total. Eighty percent (32) of the participating coalitions were rural, with 20% (8) having a population exceeding 100,000 people. Of the coalitions in counties with larger populations, one was in a major urban area with a county population above 600,000, two were in counties in smaller metropolitan areas with county populations between 300,000 and 500,000, and several others were in suburban population centers that were part of larger metropolitan areas. The coalitions were involved in various substance abuse prevention strategies at the time of data collection, including "policy changes (e.g., changing penalties and enforcement for compliance among retailers or impaired driving), mass media campaigns, prevention programming, and improving access to treatment for substance use disorders" (Christens et al., 2021, p. 5).

Of the 40 coalitions that participated, an average of 13.3 surveys were completed per coalition (min = 1; max = 35). Participant demographics were all self-report, with 66.7% of participants identifying as female and 30.6% identifying as male. Racially, 84.9% participants identified as White, 8% as Black, 1% as Native American, 0.6% as Asian, 2.3% as multiple races, and 3.3% as "other" or "prefer not to answer." Additionally, 96.6% of participants did not identify as Hispanic/Latino, while 1.2% did identify as Hispanic/Latino. Regarding participant's

highest level of formal education, 7.1% reported a high school diploma/GED; 20.8% reported some college, post high-school vocational education, or an associate's degree; 30% reported a bachelor's degree; 9.9% reported some graduate education; and 30.2% reported graduate degrees. Just under 1% reported that they had less than a high school education, and 1.2% preferred not to answer.

Data for this study were converted to be coalition-level instead of participant-level. I examined coalition means rather than individual observations for two reasons. First, two independent variables – sectoral diversity and convergence on perception of the causes of substance abuse – are measured at coalition-level. Second, the primary dependent variable, coalition unity, had an intraclass correlation of .0.097 (SE = .038). This suggests that almost 10% of the variance in individuals' perceptions of coalition cohesion is due to differences between coalitions. I therefore aimed to examine factors that may contribute to this coalition-level variance. Although there are limitations to aggregating individual observations to coalition-level means, I felt that the best way to assess the variables of interest with the available data was by using coalitions – rather than individuals – as units of analysis. After utilizing listwise deletion to remove the coalitions with too few respondents to create meaningful average measures (n=1), the sample size for this study became n=35 coalitions.

Measures

Sectoral Diversity

Participants were asked which sector they represented within the coalition, with the sector options of: "youth (18 or younger)," "parent," "business," "media," "school," "youth-serving organization," "law enforcement," "religious/fraternal organization," "civic/volunteer groups," "healthcare professional," "state, local, or tribal government agency," and "other

organization involved in reducing substance abuse." The sectors included are the 12 required sectors from the handbook for the CADCA National Community Anti-Drug Coalition Institute (National Community Anti-Drug Coalition Institute, 2004).

Previous studies have measured sectoral diversity through counts of the number of sectors represented (e.g., Kegler & Swan, 2011) and through indexes designed to assess relative levels of heterogeneity across categories (Brown et al., 2017). This study took the latter approach, following the method by Brown and colleagues (2017), who used an entropy index. Using the "entropyetc" command in STATA (version 15.1), Shannon's H entropy index values were calculated for each coalition, and then the exponentiated version of this entropy index (known as perplexity) were used as an indicator of sectoral diversity (Martín & Rey, 2000). Higher values represented greater sectoral diversity within coalitions, with values approaching zero indicating that all coalition members belonged to the same sector and values approaching twelve indicating an approximately even distribution across all twelve possible sectors. In the analytic sample of 35 coalitions, the mean index value was 5.94 (SD = 1.65), and index values ranged from 2.38 to 9.85.

Convergence on Perception of the Causes of Substance Abuse

Respondents were asked about the extent to which they thought certain things were reasons for alcohol, tobacco, and/or other drug misuse. Six prompts were provided, including "availability of alcohol, tobacco, and other drugs," "community norms towards substance use," and "youth attitudes towards substance use." Each item was rated along a three-point Likert-type scale from "not a reason" to "major reason." Within each coalition, convergence on perception of causes of substance abuse was calculated using the inverse of the coefficient of variation

(computed as the ratio of the standard deviation to the mean) for each potential cause. This inverted index was then averaged across the six options.

Coalition Unity

Respondents were asked about the extent to which they agreed or disagreed with various statements about the strength of coalition unity. Eight prompts were provided, including "feeling unity and cohesion," "group spirit between partners," "partners being open with information and honest about their motives," and "partners feeling free to express their true views even if they are different from the majority." Each item was rated along a six-point Likert-type scale ranging from "strongly disagree" to "strongly agree." Coalition unity was calculated by averaging the responses from each prompt relating to the coalition unity scale. The statements in this scale were based on Butterfoss & Kegler (2002), but specifically taken from Kegler & Swan's (2011) paper: "An Initial Attempt at Operationalizing and Testing the Community Coalition Action Theory."

Communication

Respondents were asked about the frequency and productivity of communication both between staff and coalition members and among coalition members. Frequency of communication was rated along a five-point Likert-type scale ranging from "infrequent" to "frequent;" productivity of communication was rated along a five-point Likert-type scale ranging from "unproductive" to "productive." Due to a small sample size, the frequency and productivity of communication measures were combined to preserve degrees of freedom, leaving two new variables of *Communication Between Staff & Members* and *Communication Among Members*, each containing the average score between the frequency and productivity of communication.

These new measures of broad communication were created by adding the values of productivity and frequency together per coalition and averaging them.

The decision to separate the communication measure by level of communication within the coalition instead of by "frequency" or "productivity" was made by running correlations between the variables in question and utilizing the highest correlated values. Correlation results are listed in **Table 1**.

Analytic Approach

This research was conducted as part of an action research partnership between Vanderbilt's Peabody College and the Tennessee Department of Mental Health and Substance Abuse Services (TDMHSAS). As both a student and a research assistant working with the TDMHSAS, the approach to this thesis was twofold. My intent was to not only produce an academic document for my master's capstone, but to explore actionable measures that the state-funded coalitions could utilize in their work. In the early stages of synthesizing this thesis, the initial measures relied on abstract scales that would have no actionable implementation options. I worked closely with the PhD student in charge of the overall project to ensure that the measures utilized could be acted on by the involved coalitions to address the goal of actionable implementation. Once the measures were chosen and a research design created, the statistical analyses were conducted using Stata 17.0.

Results

A total of 11 linear regression models were run to assess the relationship between sectoral diversity, convergence on perceptions of the causes of substance misuse, and coalition unity. For hypotheses 1 and 3, five linear regressions were run – the first linear regressions addressed *part a* of each hypothesis, being run with only the independent and dependent variable of the

hypothesis. The last four linear regressions of hypothesis 1 and 3 addressed *part b*: two for each moderation variable and two with an interaction term between the independent variable and each moderation variable. After running the linear regressions, likelihood-ratio tests and BIC statistics were calculated to compare the models. Hypothesis 2 does not include a moderation effect, so only one linear regression was run between the independent and dependent variables without any moderating or interaction effects. Refer to **Table 2** for the descriptive statistics of the main study variables. For ease of interpretation and increased clarity, "convergence on perceptions of the causes of substance abuse" will also be referred to as "convergence" for specifying the results.

H1: Sectoral diversity and convergence

Models 1-3: Moderation effect of communication among members

Models 1-3 correspond to H1, that as sectoral diversity increases, convergence between members on the perception of the causes of substance abuse in the community decreases. The first three models correspond to the mediating variable of communication *among* coalition members. Model 1 is the base model, an initial linear regression between sectoral diversity and convergence without a moderating variable or interaction effect. Results showed that sectoral diversity is not associated with convergence (b=0.112, p=0.899). The first model explains about 0.05% of the variation in the convergence (r-squared=0.0005). Refer to **Figure 3** for a scatterplot of model 1.

Model 2 includes the covariate of communication among coalition members without an interaction effect. Results for the second model also showed no association between sectoral diversity and convergence (b=-0.067, p=0.943). Communication among coalition members is also not associated with convergence (b=1.867, p=0.539). Model 2 explains about 1.2% of the

variation in the dependent variable (i.e., convergence on the causes of substance abuse) (r-squared = 0.0124).

Model 3 included communication among coalition members as an interaction term to assess potential moderation on sectoral diversity. Results from model 3 show that on average, an increase in sectoral diversity is associated with a significant decrease in convergence (b=-24.607, p<0.001). Increased communication among coalition members is also significantly associated with a decrease in convergence (b=-35.217, p<0.001). In addition, communication among coalition members moderates the effect of sectoral diversity on convergence – although there is a statistically significant effect of communication among coalition members on the convergence, it is for increasing levels of sectoral diversity (b=6.400, p<0.001). Model 3 explains about 52% of the variation in convergence (r-squared = 0.5196).

To test whether there was statistical evidence in favor of the changes to the models, separate likelihood ratio (LR) tests were run. The first LR test compared model 1 to model 2, finding that communication among coalition members is not a significant predictor of convergence (LR $\boldsymbol{x^2}$(1)=0.42, p=0.5177). The second LR test compared model 3 to model 2, finding that the interaction between communication among coalition members and sectoral diversity improves the model fit – there is evidence of a moderation effect of communication among members on the relationship between sectoral diversity and convergence (LR $\boldsymbol{x^2}$(1)=25.23, p<0.001).

When BIC statistics were calculated, it was found that the AIC and BIC both prefer the third model, which includes the interaction between communication among members and sectoral diversity (AIC=228.39, BIC=234.61). The BIC also provides very strong evidence in favor of model 3 (ΔBIC = 18.53; Raftery, 1995). The AIC and BIC preferences seem to align

with the R-squared and likelihood ratio tests which prefer models with an interaction between communication among coalition members and sectoral diversity (LR $\boldsymbol{x^2}$(1)=25.23, p<0.001) but do not prefer models with only communication among coalition members to models without (LR $\boldsymbol{x^2}$(1)=0.42, p=0.5177). The r-squared explains much more variation in convergence for models with an interaction than for models without an interaction (non-interaction r-squared=0.0005, interaction r-squared=0.5196).

Models 4-5: Moderation effect of communication between coalition staff and members

Models 4-5 also correspond to H1, assessing the relationship between sectoral diversity and convergence on perceptions of the causes of substance abuse, however, the moderation variable for these models is communication between coalition staff and members. Models 4 and 5 will refer to model 1 as the base model, as model 1 was a regression between sectoral diversity and convergence without any moderating variables.

For model 4, a linear regression between sectoral diversity and convergence was run with the covariate of communication between coalition staff and members. Model 4 includes no interaction effect. Results for model 4 showed that there is no association between sectoral diversity and convergence (b=0.008, p=0.771), but increased communication between coalition staff and members is significantly associated with an increase in convergence (b=.458, p<0.001). Model 4 explains about 46% of the variation in the dependent variable (i.e., convergence on the causes of substance abuse) (r-squared = 0.4622).

Model 5 included communication between coalition staff and members as an interaction term to assess potential moderation on sectoral diversity. Results from model 5 are very similar to model 3 and show that on average, with each additional point of sectoral diversity, there is a significant decrease in convergence (b=-33.085, p<0.001). Increased communication between

coalition staff and members is also significantly associated with a decrease in convergence (b=-46.913, p<0.001). In addition, there is a statistically significant effect of communication between coalition staff and members on the convergence for increasing levels of sectoral diversity (b=7.98, p<0.001). Model 5 explains about 34% of the variation in convergence (r-squared = 0.3415).

Likelihood ratio tests were again run to compare the models. The first LR test compared model 1 to model 4, finding that communication between coalition staff and members is not a significant predictor of convergence (LR $\boldsymbol{x^2}$ (1)=0.27, p=0.6020). The second LR test compared model 5 to model 4 and found that the interaction between communication between coalition staff and members and sectoral diversity does improve the model fit and there is evidence of a moderation effect of communication between coalition staff and members on the relationship between sectoral diversity and convergence (LR $\boldsymbol{x^2}$(1)=14.33, p<0.001).

The AIC and BIC both prefer model 5, which includes the interaction between communication between coalition staff and members and sectoral diversity (AIC=239.43, BIC=245.65). The BIC also provides strong evidence in favor of model 5 (ΔBIC = 7.49; Raftery, 1995). The AIC and BIC preferences seem to align with the R-squared and likelihood ratio tests which prefer models with an interaction between communication between coalition staff and members and sectoral diversity (LR $\boldsymbol{x^2}$(1)=14.33, p<0.001) but do not prefer models with only communication among coalition members to models without (LR $\boldsymbol{x^2}$ (1)=0.27, p=0.6020). The r-squared explains more variation in convergence for models with an interaction than for models without an interaction (non-interaction r-squared=0.0005, interaction r-squared=0.3415). Refer to **Table 3** for detailed regression results for hypothesis 1.

H2: Convergence and coalition unity

Model 6: No moderation effects

Model 6 corresponds to hypothesis 2, that as convergence on perception of the causes of substance abuse decreases, coalition unity also decreases. A linear regression was run between convergence and coalition unity without any moderating variables. Results showed that there is no association between convergence and coalition unity (b=0.007, p=0.254). Model 6 explains about 3.9% of the variation in coalition unity (r-squared=0.0393). Refer to **Figure 4** for a scatter plot of model 6.

H3: Sectoral diversity and coalition unity

Models 7-9: Moderation effect of communication among coalition members

Models 7-9 correspond to hypothesis 3, that as sectoral diversity increases, coalition unity decreases. It is hypothesized that this effect will be less pronounced by increased communication among coalition members and between coalition members and staff. Models 7-9 focus on the moderating variable of communication among coalition members. Model 7 is the base model for hypothesis 2, an initial regression between sectoral diversity and coalition unity without any moderating variables. Results showed that there was no association between sectoral diversity and coalition unity (b=0.038, p=.179). Model 7 explains about 3% of the variation in the dependent variable (i.e., coalition unity) (r-squared=0.0253). Refer to **Figure 5** for a scatter plot of model 7.

Model 8 included the covariate of communication among coalition members without an interaction effect. Results for model 8 also showed no association between sectoral diversity and coalition unity (b=0.007, p=0.762), but increased communication among coalition members is significantly associated with an increase in coalition unity (b=0.323, p<0.001). Model 8 explains about 38% of the variation in coalition unity (r-squared = 0.3829).

Model 9 included communication among coalition members as an interaction term to assess potential moderation on sectoral diversity. Results from model 9 were similar to models 7 and 8 in showing no association between sectoral diversity and coalition unity, though the non-significant relationship between the variables in this model is negative (b=-0.111, p=0.492). Results from model 9 also showed no association between communication among coalition members and coalition unity (b=0.143, p=0.573). Additionally, there is not a statistically significant effect of communication among coalition members on coalition unity for increasing levels of sectoral diversity (b=0.031, p=0.459). Model 9 explains about 39% of the variation in coalition unity (r-squared = 0.3939).

To test whether there was statistical evidence in favor of the changes to the models, separate likelihood ratio (LR) tests were run. The first LR test compared model 7 to model 8, finding that communication among coalition members is a significant predictor of coalition unity (LR $\boldsymbol{x^2}(1)$=14.95, p<0.001). The second LR test compared model 9 to model 8, finding that the interaction between communication among coalition members and sectoral diversity does not improve the model fit – there is no evidence for a moderation effect of communication on the relationship between sectoral diversity and coalition unity (LR $\boldsymbol{x^2}(1)$=0.63, p=0.428).

When BIC statistics were calculated, it was found that the AIC and BIC both prefer model 8, which includes communication among coalition members and sectoral diversity but does not include the interaction between them (AIC=-4.01, BIC=0.66). The BIC provides positive evidence in favor of model 8 (ΔBIC = 2.92; Raftery, 1995). The AIC and BIC preferences seem to align with the likelihood ratio tests which prefer models with communication among coalition members to models without (LR $\boldsymbol{x^2}(1)$=14.95, p<0.001), but do not prefer models that include an interaction between communication and sectoral diversity (LR

x^2(1)=0.63, p=0.428). The r-squared is less discerning, providing comparable fit statistics for models with and without an interaction (non-interaction r-squared=0.3829, interaction r-squared=0.3939).

Models 10-11: Moderation effect of communication between coalition staff and members

Models 10-11 also correspond to H3, assessing the relationship between sectoral diversity and coalition unity, however the moderation variable for this model is communication between coalition staff and members. Models 10 and 11 will refer to model 7 as the base model, as model 7 was a regression between sectoral diversity and coalition unity without any moderating variables.

Model 10 included the covariate of communication between coalition staff and members without an interaction effect. Results for model 10 showed no association between sectoral diversity and coalition unity (b=0.023, p=0.276), but increased communication between coalition staff and members is significantly associated with an increase in coalition unity (b=0.454, p<0.001). Model 10 explains about 52% of the variation in coalition unity (r-squared = 0.5205).

Model 11 included communication between coalition staff and members as an interaction term to assess potential moderation on sectoral diversity. Results again showed no association between sectoral diversity and coalition unity, though the relationship is negative (b=-0.256, p=0.275). Results also showed no association between communication between coalition staff and members and coalition unity (b=0.76, p=0.816). In addition, there is not a statistically significant effect of communication between coalition staff and members on coalition unity for increasing levels of sectoral diversity (b=0.067, p=0.234). Model 11 explains about 54% of the variation in coalition unity (r-squared = 0.5422).

Likelihood ratio (LR) tests were again run. The first LR test compared model 7 to model 10, finding that communication between coalition staff and members is a significant predictor of coalition unity (LR $\boldsymbol{x^2}(1)$ =23.78, p<0.001). The effect of sectoral diversity on coalition unity is not moderated by communication between coalition staff and members (LR $\boldsymbol{x^2}(1)$ =1.63, p=0.2022).

When BIC statistics were calculated, it was found that the AIC and BIC both prefer model 10, which includes communication between coalition staff and members and sectoral diversity but does not include the interaction between them (AIC=-12.84, BIC=-8.17). The BIC provides weak evidence in favor of model 10 (ΔBIC=1.93; Raftery, 1995). The AIC and BIC preferences seem to align with the likelihood ratio tests which prefer models with communication between coalition staff and members to models without (LR $\boldsymbol{x^2}(1)$ =23.78, p<0.001), but do not prefer models that include an interaction between communication and sectoral diversity (LR $\boldsymbol{x^2}(1)$ =1.63, p=0.2022). The r-squared is less discerning, providing comparable fit statistics for models with and without an interaction (non-interaction r-squared=0.5205, interaction r-squared=0.5422). Refer to **Table 5** for detailed regression results.

Discussion

Context for Findings

Substance abuse is a growing issue in many areas, including the state of Tennessee, which has an unusually high overdose death rate compared to other U.S. states (Pellegrin, 2021). One method for addressing substance abuse is found in community-based coalitions, which have been proven to achieve community change and prevent public health issues (Centers for Disease Control and Prevention, 2008; Feinberg et al., 2010; Hawkins et al., 2009). Coalitions can provide unique benefits to communities through their diverse representation of various

stakeholders within the community, but this representation through sectoral diversity can also produce negative effects alongside the benefits (Daphi et al., 2019; Foster-Fishman et al., 2001; Butterfoss & Kegler, 2012). The goal of this study was to empirically examine relationships between sectoral diversity, convergence of coalition member's perceptions on substance abuse, coalition unity, and coalition communication with a sample of 35 substance abuse prevention community coalitions in Tennessee.

Overall Findings

Results regarding the first hypothesis showed favor for the models including the interaction effects of the moderating communication variables. When the moderating effects of communication among coalition members and between coalition staff and members were added as interaction effects, both model's results supported *part a* of the first hypothesis, suggesting that increases in sectoral diversity do cause decreases in how likeminded coalition members are regarding the causes of substance abuse in their community. Interestingly, both interaction models found that increased communication among coalition members and between coalition members and staff are associated with *decreases* in how much members agree on the causes of substance abuse in their communities. Although the communication variables do moderate the model variables, the results are opposite from what was hypothesized through *part b* of hypothesis 1, that increased coalition communication would moderate the negative effects of sectoral diversity. Thus, this study failed to find support for *part b* of hypothesis one.

Results for hypothesis two showed that there was no significant association between convergence on the causes of substance abuse and coalition unity, failing to support the second hypothesis.

Differing from the results of hypothesis one, the results for hypothesis three preferred the models including the moderating variables but not those with an interaction term. Results for models with both moderating variables showed no association between sectoral diversity and coalition unity. This does not support *part a* of hypothesis three, that increases in sectoral diversity would be associated with a decrease in coalition unity. However, the results found support for *part b* of hypothesis three, with models including both moderating variables finding that increased communication among coalition members is significantly associated with an increase in coalition unity.

These findings are interesting and raise questions about the increasing focus of sectoral diversity within community coalition literature. This thesis found very little significance regarding the effects of sectoral diversity on coalition measures, with the only significance found on the effect of convergence on perception of the causes of substance abuse. These results make sense both logistically and theoretically. Logistically, more diversity in a coalition means more diverging people and opinions and a smaller likelihood that those diverse actors will completely agree. Theoretically, these results are in accordance with Ostrom et al. (1999), which found that diversity can cause issues with forming a shared understanding and creating agreed-upon solutions within a coalition.

This study primarily found significance regarding the measures of communication. Specifically, it was found that increases in communication led to increases in coalition unity. These results are in accordance with several other studies that have found communication and interaction between diverse membership to be necessary for a well-functioning coalition (Brown et al., 2017; Lasker et al., 2001). However, it was also found that increased communication is associated with a decrease in agreement between coalition members. Because the measure for

communication in this study was a combination of productivity and frequency, I can only speculate as to the effect. It is possible that when communication is more frequent, there are more opportunities for disagreements between members, leading to decreased convergence of opinions. This leads to the question of whether a shared perception among coalition members is truly necessary for unity. Since coalition unity is not sacrificed, it is possible that increased communication leads to productive disagreement that transforms a coalition's capacity, as was found by Chavis (2001).

Implications for practice

Since results find that increases in communication lead to positive outcomes of coalition unity, community-based coalitions seeking to increase the unity of their membership can aim to create opportunities for both more frequent and more productive communication within their organization. Significance was found with communications both among members and between members and staff, so it will be important to not only communicate from staff to the membership but to be programmatically dedicated to fostering networking and relationships between members. Options may include the addition of regular networking opportunities during coalition meetings, sending a scheduled "newsletter" to keep members up to date on coalition activities, or hosting occasional team building opportunities outside of coalition duties. Since results also showed communication to decrease agreement between members, it is suggested that coalition members lean into differing opinions and utilize them to foster productive energy.

Strengths, Limitations, and Future Research

The findings of this study **s**hould be considered in conjunction with several strengths and limitations. The study collected data from several diverse coalitions across the entire state of Tennessee, leading to a rich data source. Although the overall survey had 531 participants, once

the results were condensed to achieve coalition-level means for this study, the sample size was reduced to that of the 35 coalitions. With a small sample size, there was a larger standard error and a higher chance of spuriousness.

The small sample size also meant that there were not enough observations to run one single larger analysis, so multiple tests were run to preserve necessary variation in the models. Although this preserved variation, it also increased the risk of finding significance due to chance alone. Combined with the small sample size, these factors meant there was a higher chance of both type 1 and type 2 error, so the results from this study should be considered carefully. The coalitions represented within the study were limited to those who received state funding from TDMHSAS at the time of data collection. Because the design necessitated coalition- level averages, certain measures such as length of involvement in the study could not be controlled for. Future studies should aim to widen the scope of coalitions represented to mitigate these potential errors and examine effects that could be more generalizable. Future research should also focus on addressing longitudinal models. More recent iterations of the survey collected with TDMHSAS have addressed this issue by building the foundation for longitudinal tracking of coalitions, so future studies utilizing data from these coalitions will be able to include a longitudinal aspect.

Another limitation can be found in the measurement of the variables themselves. Although the latent constructs utilized within this study are well-developed measures of the concepts being studied (Brown et al., 2017; Kegler & Swan, 2011), there is an overarching risk of social desirability bias. Since the data were collected in conjunction with the organization that provides funding to the coalitions (TDMHSAS), it is especially possible that the respondents felt the need to reply favorably for their coalition even though their results were anonymous.

Additionally, although relationships were found between several measures, the variables utilized in the study are unable to show or suggest directionality. For example, a coalition with higher unity may have higher levels of communication due to the unity, not the other way around. Future studies should consider utilizing a mixed methods approach for data collection to gather more information and context from the respondents to address these limitations.

Lastly, the measure of sectoral diversity in this study is one-dimensional, as respondents had to choose only one sector they represented. Many people wear multiple hats in their community, and members might represent various sectors (e.g., a parent who is a healthcare worker and a member of a faith-based organization). Due to this, the measure of sectoral diversity may not actually reflect the demographics of the coalitions in the survey. If anything, this causes the study to under-report the level of sectoral diversity, meaning that significance may have been found if sectoral diversity were measured in a less narrow way. Due to the representation of sectors despite these limitations, the results are likely still indicative of trends, though future studies should be more intentional about operationalizing it sectoral diversity and allowing for respondents to choose more than one sector they represent.

Conclusion

This study joins the growing body of literature surrounding sectoral diversity in community-based coalitions. The findings align with several other studies about the relationship between sectoral diversity and coalition functioning and add key insights into the importance of communication within coalitions. Promoting communication can lead to improved coalition unity, providing an actionable method of improving coalition functioning without the need for costly or time-consuming interventions.

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Appendix: Tables & Figures

Table 1

Correlations Between Communication Measures

	Productivity Between Staff and Members	**Productivity** Among Members	**Frequency** Between Staff and Members	**Frequency** Among Members
Productivity Between Staff and Members	–			
Productivity Among Members	0.8113	–		
Frequency Between Staff and Members	0.8655	0.6828	–	
Frequency Among Members	0.7860	0.9587	0.7233	–

Note. N = 35. I examined the relationship between communication measures to determine which were more highly correlated. The strongest correlation values are indicated in red and represent the communication values I chose to combine.

Table 2

Descriptive Statistics of Thesis Variables

Variable	Min.	Max.	Mean/Prop.	SD
Coalition Unity	3.93	4.99	4.40	.27
Communication Among Members	2.38	4.72	3.78	.51
Communication Between Staff & Members	2.95	4.61	4.10	.41
Sectoral Diversity	2.38	9.85	5.94	1.65
Convergence on Causes of Substance Abuse	54.79	100.00	73.15	8.25

Note. N = 35.

Table 3

Linear Regression for Convergence: Hypothesis 1, Models 1-5

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Sectoral Diversity	0.112	-0.067	-24.607***	0.173	-33.085***
	(0.872)	(0.926)	(4.339)	(0.890)	(8.429)
Communication Among Members		1.867	-35.217***		
		(3.010)	(6.824)		
Sectoral Diversity # Communication Among Members			6.400***		
			(1.119)		
Communication Between Staff & Members				-1.782	-46.913***
				(3.566)	(11.770)
Sectoral Diversity # Communication Between Staff & Members					7.980***
					(2.015)
Constant	72.489***	66.484***	207.106***	79.433***	266.959***
	(5.373)	(11.096)	(25.805)	(14.923)	(48.928)
Observations	35	35	35	35	35
BIC	253.144	256.280	234.609	256.427	245.648

Note. N = 35. I examined the relationship between sectoral diversity and communication measures on level of convergence. Interactions between sectoral diversity and communication were also examined (indicated with #). Standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4

Linear Regression for Unity: Hypothesis 2, Model 6

Variable	Model 6
Convergence on Causes of Substance Abuse	0.007
	(0.006)
Constant	3.924***
	(0.412)
Observations	35
BIC	12.593

Note. N = 35. I examined the relationship between convergence and communication measures on coalition unity. Standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5

Linear Regression for Unity: Hypothesis 3, Models 7-11

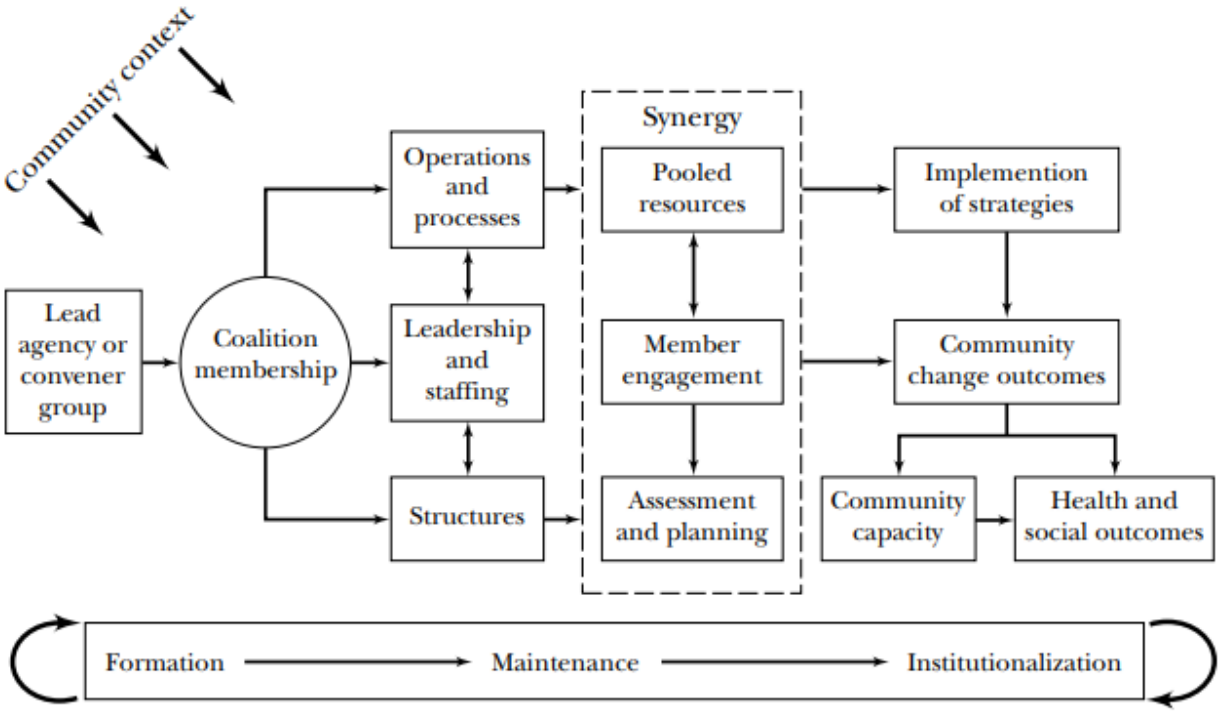
Variable	Model 7	Model 8	Model 9	Model 10	Model 11
Sectoral Diversity	0.038	0.007	-0.111	0.023	-0.256
	(0.028)	(0.024)	(0.160)	(0.020)	(0.231)
Communication Among Members		0.323***	0.143		
		(0.078)	(0.252)		
Sectoral Diversity # Communication Among Members			0.031		
			(0.041)		
Communication Between Staff & Members				0.454***	0.076
				(0.081)	(0.322)
Sectoral Diversity # Communication Between Staff & Members					0.067
					(0.055)
Constant	4.173***	3.136***	3.815***	2.403***	3.976**
	(0.172)	(0.288)	(0.951)	(0.341)	(1.339)
Observations	35	35	35	35	35
BIC	12.057	0.658	3.585	-8.171	-6.242

Note. N = 35. I examined the relationship between sectoral diversity and communication measures on coalition unity. Interactions between sectoral diversity and communication were also examined (indicated with #). Standard errors in parentheses.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1

Community Coalition Action Theory conceptual model



Note. From "Toward a Comprehensive Understanding of Community Coalitions: Moving from Practice to Theory," by Butterfoss, F. D., & Kegler, M. C., 2002), in *Emerging Theories in Health Promotion Practice and Research,* p. 163.

Figure 2

Theoretical Moderated Mediation Model for Thesis Hypotheses

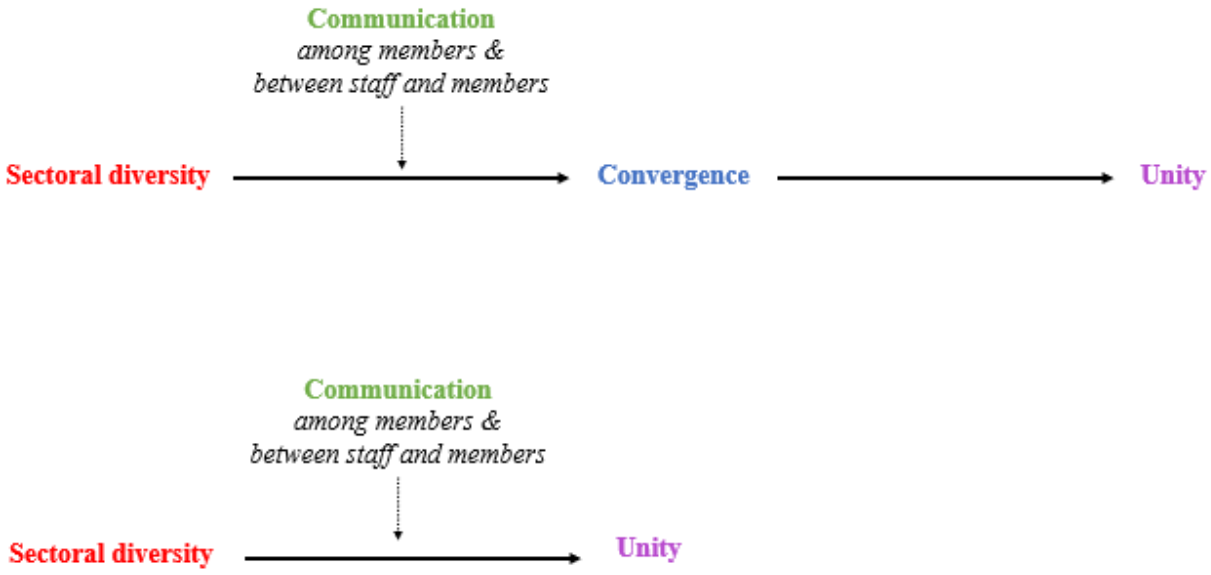


Figure 3

Scatterplot of Model 1: Convergence on the Perceptions of the Causes of Substance Abuse by Sectoral Diversity

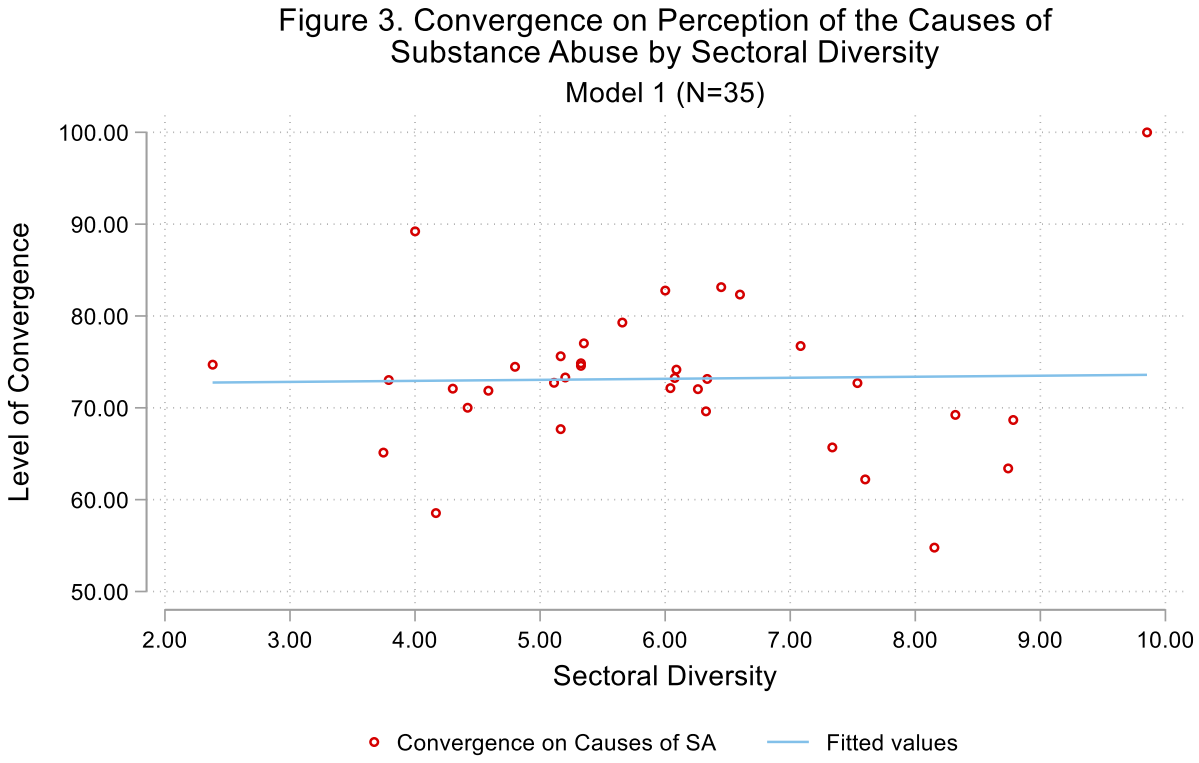


Figure 4

Scatterplot of Model 6: Coalition Unity by Convergence on Perception of the Causes of Substance Abuse

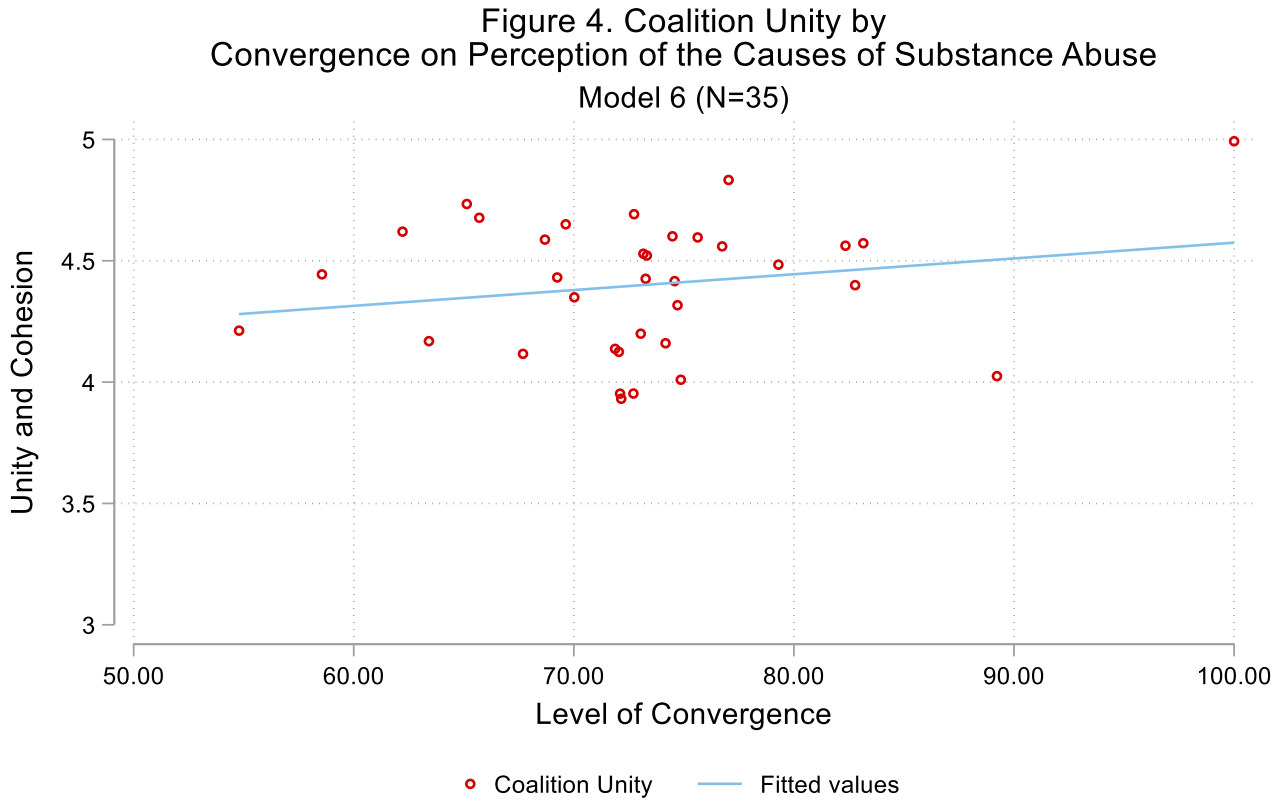


Figure 5

Scatterplot of Model 7: Coalition Unity and Cohesion by Sectoral Diversity