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The moderating role of social networks in the relationship between alcohol consumption and treatment utilization for alcohol-related problems

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Abstract

Many individuals wait until alcohol use becomes severe before treatment is sought. However, social networks, or the number of social groups an individual belongs to, may play a moderating role in this relationship. Logistic regression examined the interaction of alcohol consumption and social networks as a predictor of treatment utilization while adjusting for sociodemographic and clinical variables among 1,433 lifetime alcohol-dependent respondents from wave 2 of the National Epidemiologic Survey on Alcohol Related Conditions (NESARC). Results showed that social networks moderate the relationship between alcohol consumption and treatment utilization such that for individuals with few network ties, the relationship between alcohol consumption and treatment utilization was diminished, compared to the relationship between alcohol consumption and treatment utilization for individuals with many network ties. Findings offer insight into how social networks, at times, can influence individuals to pursue treatment, while at other times, influence individuals to stay out of treatment, or seek treatment substitutes.

Keywords

Social networks; Alcohol dependence; Treatment utilization

1. Introduction

1.1. Treatment for alcohol related problems

An estimated 8.5% of Americans experience an alcohol use disorder at some point in the past-year (Hasin, Stinson, Ogburn, & Grant, 2007). While effective treatment exists, only about 28% of individuals suffering from alcohol use disorders seek help for their problems (Cohen, Feinn, Arias, & Kranzler, 2007). Common reasons that many individuals with alcohol use disorders site for not seeking treatment include: feeling like they are strong enough to handle it on their own, thinking the problem will get better on its own, or they stopped drinking on their own (Cohen et al., 2007). From these commonly cited reasons for not seeking treatment, it is assumed that most individuals with alcohol problems wait until their problems are severe before any treatment is sought. This conclusion is further supported in research which suggests that an individual's level of alcohol consumption is a robust measure associated with treatment use (Booth, Yates, Petty, & Brown, 1991; Kaskutas, Weisner, & Caetano, 1997), such that higher rates of alcohol consumption are associated with higher rates of treatment utilization.

1.2. Social networks and treatment utilization

An objective of *Healthy People 2020* (USDHHS, 2010a) is to increase the number of individuals with alcohol problems who receive treatment. Paired with the National Institutes

of Health strategic initiative of systems-thinking approaches to health (USDHHS, 2010b), the number of groups an individual belongs to in their social network may reveal important keys to how persons experiencing health problems, such as alcohol use disorders, adopt strategies to promote health and well-being.

Generally speaking, social networks represent a stable influence in decisions made concerning health and wellness (Cohen, Doyle, Skoner, Rabin, & Gwaltney, 1997; House, Landis, & Umberson, 1988; Morgan, Neal, & Carder, 1997). Here, social networks are examined using a social network diversity framework such that social networks are defined as the number groups for which individuals report some level of participation between 2 weeks and 1 month (Brissette, Cohen, & Seeman, 2000).

When operationalized in this manner, the available research on the relationship between social networks and treatment utilization for alcohol problems presents conflicting findings. On the one hand, social networks can have a negative relationship with treatment utilization for alcohol problems. For example, the increased negative feedback concerning an individual's drinking that comes from large social networks is associated with natural recovery (remission from alcohol use disorder symptoms in the absence of treatment utilization) (Humphreys & Noke, 1997). Additionally, large amounts of social support found in large social networks are negatively related to treatment utilization as well (Maulik, Eaton, & Bradshaw, 2009).

On the other hand, social networks can have a positive influence on treatment utilization. For example, social networks that transmit social norms about cutting down on alcohol consumption is a significant predictor of treatment utilization (Weisner, 1993). Additionally, social networks that transmit information about treatment services, including where to access treatment, what types of treatments are available, and whether they are perceived as effective is also associated with increased treatment utilization (Gourash, 1978).

From these findings, it is not clear what role social networks play in relationship to treatment utilization for alcohol related problems. However, when social networks are considered as a moderator in the relationship between alcohol consumption and treatment utilization, a possible explanation for the roles of social networks emerge. For example, individual with high levels of alcohol consumption that belong to a large number of social networks may receive the positive influences from social networks known to have a positive relationship with treatment utilization, including social norms messages concerning cutting down on alcohol use and where to access treatment services. Furthermore, individuals with high levels of alcohol consumption that belong to a large number of social networks may have problems so great that the negative feedback concerning drinking and elevated social support may not provide the assistance needed to achieve recovery unassisted by treatment (e.g. natural recovery). Thus, for individuals with high levels of alcohol consumption that belong to many social networks, it is likely that a strong, positive relationship between alcohol consumption and treatment utilization exists.

However, individuals with high levels of alcohol consumption that belong to few social networks may be offered less knowledge from these networks concerning whether their drinking is excessive and what they can do about it (seeking treatment). Given the diminished social influence, individuals with high levels of alcohol consumption who belong to few social networks may experience a weakened relationship between alcohol consumption and treatment utilization compared to individuals with high alcohol consumption that belong to a large number of social networks.

In an attempt to understand the role that social networks play in treatment use for alcohol related problems, the moderating role that social networks play between level of alcohol

consumption and treatment utilization for alcohol related problems is examined. The following hypotheses are formally tested: 1) Controlling for additional known factors related to treatment utilization, there is a positive relationship between higher alcohol consumption and treatment utilization for alcohol related problems. 2) Controlling for additional known factors related to treatment utilization for alcohol problems, social networks moderate the positive relationship between alcohol consumption and treatment utilization. As the number of social networks increases, the strength of the relationship between alcohol consumption and treatment utilization increases. However, as the number of network ties decreases, the strength of the relationship between alcohol consumption and treatment utilization decreases.

2. Materials and methods

2.1. Sample

The sample for this study includes respondents who met diagnostic criteria for past-year DSM-IV alcohol dependence at wave 2 of the National Epidemiologic Survey on Alcohol Related Conditions (NESARC) (N = 1,433). Alcohol dependence and psychiatric disorders were established with the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS-IV) (Grant et al., 2007, 2003, Grant, Kaplan, & Stinson, 2007; Ruan, Goldstein, Chou, Smith, et al., 2008). A sample of adults with alcohol dependence was preferred to examine treatment utilization, as previous work has shown individuals with alcohol dependence are 3 times as likely to seek treatment than individuals with less severe alcohol use disorders, including alcohol abuse (Cohen et al., 2007). NESARC is a population-representative survey of United States adults aged 18 or older living in noninstitutionalized settings (Grant et al., 2007; Grant, Dawson, et al., 2003; Hasin et al., 2007). The NESARC data are weighted to represent the U.S. general population based on the 2000 decennial census and to reflect survey design characteristics including oversampling of women, Black and Hispanic individuals, and persons of younger age (Grant, Dawson, et al., 2003). Only wave 2 NESARC data were used because social network measures are contained only in the second wave. The response rate for wave 2 was 86.7% among wave 1 participants who were eligible for re-interview. All analyses of NESARC data were conducted in methods consistent with IRB guidelines for secondary data analysis.

2.2. Measurement

2.2.1. Alcohol consumption—Individual alcohol consumption is measured through self-reported average daily alcohol consumption in the past year, in ounces. This is the only measure present in the NESARC that examines alcohol use across a variety of alcoholic beverages, including beer, wine, wine coolers and hard liquor. Alcohol consumption is computed as a continuous measure that standardizes alcohol content, in ethanol, among different beverages. The reliability of this alcohol consumption measure available in the NESARC has shown an acceptable level of reliability (ICC = .70) (Grant, Dawson, et al., 2003).

2.2.2. Social networks—Social networks are measured by the social network index (Cohen et al., 1997), which examines the number of social groups in which the respondent has regular contact (i.e. at least once every 2 weeks) with at least one person. Through the Social Network Index, a count variable was created that assessed individuals for membership in 11 different types of social groups. See Table 1 for the types of groups assessed in the Social Network Index.

2.2.3. Treatment utilization—Treatment utilization is conceptualized as the receipt of any past-year treatment for alcohol related problems versus no treatment among any of the

13 help sources examined in the NESARC, including alcoholics anonymous, family/social services, alcohol/drug detox program, inpatient psychiatric program, outpatient clinic, alcohol/drug rehab program, emergency room, halfway house, crisis center, employee assistance program, clergy/priest/rabbi, private physician, or "other" agency or professional.

2.2.4. Sociodemographics—Participants were assessed for several sociodemographic characteristics including racial/ethnic group, including White (non-Hispanic), Black, American Indian/Alaskan Native, Asian/Pacific Islander, and Hispanic, gender, age (in years), and education status, including less than high school/GED equivalent, completed high school/GED equivalent, and more than high school/GED equivalent. Participants were also assessed for a categorical measure examining annual household income, and a binary variable examining whether individuals had some form of insurance from the 7 types examined in the NESARC in the previous year, including Medicare, Medi-gap, Medicaid, VA Tricare, private insurance, long-term care or any "other" form of health insurance.

2.2.5. Clinical characteristics—Binary variables examined whether DSM-IV criteria was met for either past-year drug use disorder, past-year major depressive disorder, or a past-year anxiety disorder, including either the presence of social phobia, panic disorder, and generalized anxiety disorder. These disorders were selected for the study given their higher levels of prevalence in the U.S. population compared to other mental health disorders (Hasin et al., 2007).

2.3. Analyses

Analyses were computed using weighted population analyses in STATA Version 12 (StataCorp, 2011). These weighted analyses adjust standard errors of estimates for complex survey sampling design effects including clustered data. Logistic regression analysis was used to examine whether social networks moderate the relationship between level of alcohol consumption and treatment utilization for alcohol related problems, controlling for sociodemographic and clinical characteristics.

3. Results

Among NESARC respondents with past-year alcohol dependence, a mean alcohol use level of 2.48 ounces of ethanol per day in the past year was reported. Individuals reported a mean membership of 4.41 (out of 11) groups in their social networks (SD = 2.27). Additionally, 67.5% of participants were White/non-Hispanic, 68.6% were male, with a mean age of 36.6 year. Most individuals reported an education level beyond a high school/GED diploma (57.9%). Mean annual household income for the sample was $35,000 to $69,000, and 76.4% reported some form of insurance in the past year. In terms of co-occurrence, 10.2% reported a past-year drug use disorder, 22.9% reported a past-year major depressive disorder, and 27.8% reported a past-year anxiety disorder. Last, 11.9% of past-year alcohol-dependent adults in the NESARC reported seeking any form of treatment for alcohol related problems in the past year.

A logistic regression model, examining whether social networks serve as a moderator for the influence of alcohol consumption on treatment utilization is presented in Table 2. This analysis examined alcohol consumption as an independent variable, social networks and their mean-centered interaction term with alcohol consumption (moderating variable) as predictors of past year treatment utilization (dependent variable) while adjusting for sociodemographic and other clinical variables (control variables). This model showed that men had higher odds of treatment utilization than women (OR = 1.91, $p < .05$). Additionally, individuals older in age also showed higher odds of treatment utilization than individuals

younger in age (OR = 1.02, $p < .05$). In terms of co-occurring disorder, individuals with a past-year major depressive disorder were more likely to utilize treatment (OR = 2.12, $p < .01$), as well as individuals with a past-year anxiety disorder (OR = 1.94, $p < .05$). Individuals with higher levels of alcohol consumption had higher odds of treatment utilization (OR = 1.09, $p < .05$). Social networks were not a significant predictor of treatment utilization. However, the product term created to examine whether social networks moderate the relationship between alcohol consumption and treatment utilization was significant (OR = 1.04, $p < .05$).

Regression coefficients associated with the relationship between alcohol consumption and probability for treatment utilization for individuals who belong to few social networks (1 standard deviation below the sample mean of network groups, or about 2.14 social groups) and many social networks (1 standard deviation above the sample mean of network groups, or about 6.68 social groups) are presented in Fig. 1. Simple slopes analysis to examine regression lines presented in Fig. 1 showed that the slope for individuals who belong to few social networks differed significantly from zero, $t(1,435) = 2.45$, $p < .01$. Further, simple slopes analysis showed that the slope for individuals who belong to many social networks differed significantly from zero as well, $t(1,435) = 2.26$, $p < .05$, suggesting that level of alcohol consumption is significantly related to an increased probability of treatment utilization among both individuals with few social networks and individuals with many social networks. However, for individuals who belong to few social networks, the effect of alcohol consumption on treatment utilization was highly attenuated compared to the effect of alcohol consumption on treatment utilization for individuals who belong to many social networks.

4. Discussion

The findings show that the relationship between alcohol consumption and treatment utilization is dependent in part, on the number of groups in an individual's social network. These findings can offer insight into the complex relationship that social networks have in relation to treatment utilization, which at times, influence individuals to pursue treatment (Gourash, 1978; Weisner, 1993), but at other times, influence individuals to stay out of treatment or seek treatment substitutes (Humphreys & Noke, 1997; Maulik et al., 2009).

Specifically, results show that controlling for both sociodemographic and clinical factors, a higher level of alcohol consumption, is a correlate of treatment utilization. This finding offers further evidence into the conclusion from previous work that many individuals wait until alcohol use is severe before they seek treatment (Booth et al., 1991; Kaskutas et al., 1997). However, logistic regression analyses showed that while controlling for sociodemographic and other clinical variables, social networks moderate the relationship between alcohol consumption and treatment utilization. Individuals who belong to a large number of social networks paired with higher levels of alcohol consumption show a dramatically increased probability for treatment utilization. These results may be explained by findings that show while social networks offer support and feedback concerning alcohol use, which serve as a treatment substitute (Humphreys & Noke, 1997; Maulik et al., 2009), an individual with a high level of alcohol consumption may exceed the capacity for a network to offer these treatment substitutes effectively. Additionally, results show that the presence of few social networks attenuates the relationship between alcohol consumption and treatment utilization. This finding may suggest that an individual with high alcohol consumption who belongs to only a small number of social networks ties may receive considerably less social influence concerning whether their drinking is, in fact, excessive and what to do about it (e.g. where to seek treatment) (Gourash, 1978), thus reducing the use of treatment for alcohol-related problems.

4.1. Limitations

While this paper offers insight into resolving some of the differences in research concerning how social networks influence treatment utilization, there are important limitations worth discussing. First, data from the NESARC is of a cross-sectional design. These findings are correlational and with the available data, formal tests of causal paths concerning alcohol consumption, social networks, and treatment utilization cannot be examined. Given the cross-sectional nature of the data, an alternative interpretation concerning these results can be that social networks may be the result of treatment entrance, such that individuals with high levels of alcohol consumption leave the treatment setting and experience a dramatic increase in social networks, compared to individuals with low levels of alcohol consumption who have sought treatment. Additionally, it is assumed that social networks are stable over time. However, evidence suggests that this is a valid assumption (Morgan et al., 1996; Treadwell, Leach, & Stein, 1993), even among individuals with alcohol use disorders (Favazza & Thompson, 1984).

4.2. Conclusions

With these limitations in mind, there is caution in interpreting the implications of findings. However, these results may offer several implications for increasing the use of treatment services for individuals with alcohol related problems. First, these results offer insight into high-risk groups that may benefit substantially from interventions designed to increase the use of treatment services. Through identifying alcohol dependent individuals that have high levels of alcohol consumption and small social networks, tailored interventions can be delivered to successfully meet initiatives contained in *Healthy People 2020* (USDHHS, 2010a) to increase the proportion of persons who need treatment for alcohol related problems.

Additionally, these results offer challenges for those interested in using social network-based intervention strategies to promote treatment for alcohol related problems. Past research suggests that 1) not all individuals with alcohol use disorders have small social networks (McCrady, 2004), and 2) some groups are more likely than others to benefit from interventions to increase the number of groups in one's social network. For example, previous research suggests that women (opposed to men) (Cohen & Janicki-Deverts, 2009), individuals with a high level of problem severity (such as increased levels of alcohol consumption) (Burk, van der Vorst, Kerr, & Stattin, 2012), individuals with lower socioeconomic backgrounds (Westermeyer, Thuras, & Waaijer, 2004), and individuals with co-occurring mental health and substance use disorders (Tracy & Biegel, 2006) are most likely to have fewer social networks. Identifying specific populations of individuals with alcohol use disorders who have few social networks will offer a tremendous amount of insight into the creation of social network-based interventions for promoting treatment among individuals with alcohol use disorders.

For example, social norms-based interventions that seek to reduce the social influence of alcohol use have proven to be effective (DeJong et al., 2006; Mattern & Neighbors, 2004; Perkins & Craig, 2006). These interventions may be improved through a targeted application towards individuals with alcohol problems that have few groups in their social network. Additionally, it may be likely that efforts to increase social networks among individuals with alcohol problems who have few social networks may have an indirect effect on increased treatment utilization. However, this claim remains untested and should be considered a direction for future research.

These results offer additional avenues for future research on social networks. Current research on social networks rests heavily on descriptive properties of networks, with careful

attention to how network properties influence particular outcomes (Borgatti, Mehra, Brass & Labianca, 2009). However, the current state of social network research associated with alcohol use in general, and treatment utilization in specific, has focused mainly on social networks as a predictor of either decreased symptomatology or diminished alcohol use following treatment (Favazza & Thompson, 1984; Kelly, Stout, Magill, & Tonigan, 2011; Bullers, Cooper, & Russell, 2001). The notion that social networks serve as a moderator in direct relationships associated with treatment entry may open new fronts in social network research, including how social networks fit empirically within broader sociological phenomena, including social capital (Valente, Gallaher, & Mouttapa, 2004).

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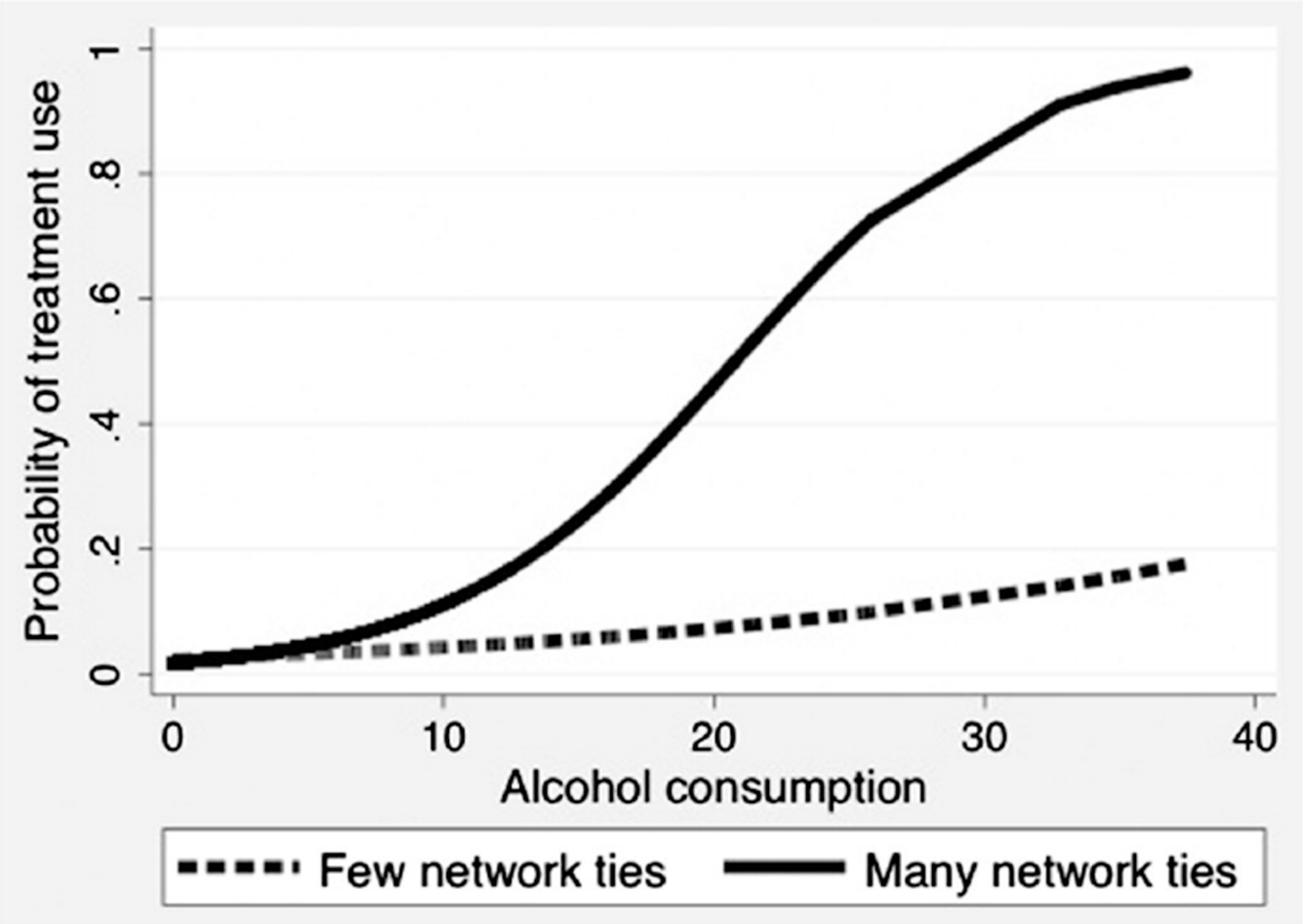

Fig. 1.
Moderation of social network ties on the relationship between alcohol consumption and treatment use for alcohol dependence.

Table 1

Social Network Index.

1	Are you married, dating, or involved in a romantic relationship? (Yes/No)
2	How many of your grown children do you see or talk to on the phone or Internet at least once every 2 weeks?
3	Do you see or talk on the phone or Internet to any of your parents or people who raised you at least once every 2 weeks? (Yes/No)
4	Do you see or talk on the phone or Internet to your spouse's/partner's parents or other people who raised your spouse/partner at least once every 2 weeks? (Yes/No)
5	How many of your other relatives, not counting spouses, partners, children, parents or parents-in-law do you see or talk to on the phone or Internet at least once every 2 weeks?
6	How many close friends do you see or talk to on the phone or Internet at least once every 2 weeks?
7	How many fellow or teachers do you see or talk to on the phone or Internet at least once every 2 weeks?
8	How many people do you work with that you see or talk to on the phone orInternet at least once every 2 weeks?
9	How many of your neighbors do you visit or talk to at least once every 2 weeks?
10	How many people involved in volunteer/community service do you see or talk to on the phone or Internet at least once every 2 weeks?
11	How many members of your religious group do you see or talk to socially every 2 weeks?
12	Thinking about all other groups together, how many members of these other groups do you see or talk to on the phone or Internet at least once every 2 weeks?

Social network diversity scoring: If respondent is married, or responds with a number of one or greater for each of the following questions, participant is a member of the social network.
Social network size scoring: Count of the number of individuals a respondent reports within each of the following questions.
Source: Brissette et al., 2000.

Table 2

Logistic regression of treatment use among individuals with alcohol dependence.

***N* = 1,433**	**OR**	**SE**	**95% CI**
Alcohol use severity[1]	1.09**	0.03	1.04–1.14
Network ties[2]	0.99	0.07	0.86–1.16
Alcohol use severity X network ties	1.04*	0.02	1.01–1.08
Race/Ethnicity			
White	-	-	
Hispanic	1.02	0.32	0.39–1.45
African American	0.76	0.24	0.24–3.24
American Indian/Alaskan Native	0.94	0.57	0.18–10.73
Asian/Pacific Islander	1.42	1.45	0.51–1.93
Gender			
Male	1.91*	0.49	1.23–3.19
Female	-	-	
Age (in years)	1.02*	0.01	1.01–1.04
Education			
Less than HS/GED equivalent	-	-	
Completed HS/GED equivalent	1.59	0.59	0.71–3.76
More than HS/GED equivalent	1.47	0.47	0.53–4.59
Income[3]			
$0–$19,999	-	-	
$20,000–$34,999	0.99	0.33	0.51–1.94
$35,000–$69,999	1.15	0.34	0.63–2.10
$70,000 or more	0.75	0.24	0.39–1.46
Insurance status[4]	1.12	0.31	0.64–1.96
Past-year drug use disorder	1.3	0.42	0.68–2.48
Past-year major depression	2.12**	0.53	1.28–3.51
Past-year anxiety disorder	1.94*	0.49	1.17–3.22

[1] Measured as average daily alcohol consumption in past year, in ounces.

[2] Measurement from the Social Network Index (Cohen et al., 1997).

[3] Measurement in past-year household income.

[4] Measured as percent with any health insurance in past-year.

* $p < .05$.

** $p < .01$.