

Willingness for Treatment as a Predictor of Retention and Outcomes

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SUMMARY. Retention in drug treatment is important to successful outcomes. The purpose of this study was to test assumptions made in the development and implementation of the ASSET project. The three assumptions were that living conditions of the homeless adult drug user influence willingness for treatment; willingness relates to treatment tenure; and, conditions, willingness and time in treatment influence treatment outcomes. Data on alcohol use, drug use, employment and housing as well as motivation, readiness and suitability of treatment were collected from 494 homeless adults at baseline and at follow-up. Data were subjected to multivariate causal analysis using factor analytic structural equations modeling. Practical fit indices were acceptable. The measurement model confirmed a higher order

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construct labelled willingness encompassing motivation, readiness and suitability. The structural model demonstrated that willingness positively related to treatment tenure; willingness positively influenced change in drug use and housing; and, tenure related positively to change in housing. [Article copies available from *The Haworth Document Delivery Service*: 1-800-342-9678.]

For drug users, retention in treatment is related to successful outcomes.¹⁻¹⁰ In Therapeutic Communities (TCs), clients who stay longer in treatment have less drug use and lower unemployment at discharge and in posttreatment years than do clients with shorter tenures.¹¹⁻¹⁵ Condelli and De Leon¹⁰ report that retention rates in TCs are lower than methadone maintenance programs but higher than out-patient drug free programs. A characteristic curve for attrition in traditional TCs shows that dropout is highest in the first 30 days, rises through 90 days and then decreases sharply.¹⁵⁻¹⁶ Since traditional TC intervention lasts between 180 to 240 days, few admissions stay long enough to maximize treatment.

Research on correlates of retention has examined sociodemographic characteristics of clients; their attitudes, perceptions and beliefs; and/or circumstances related to their entry into treatment.^{5,7,8,17-19} However, as Condelli and De Leon¹⁰ report, no client profile has been found that strongly predicts retention in TCs or in any other drug treatment program.

For TCs, De Leon and Jainchill²⁰ hypothesize that four perceptual factors singularly or in combination significantly influence retention. These factors are circumstances (external reasons that influence an individual to seek treatment); motivation (an individual's internal reasons for change); readiness (an individual's perception that treatment is needed); and, suitability (an individual's perception that the treatment is appropriate for his/her needs). Motivation for treatment has long been considered important to entering and staying in treatment.²¹⁻²⁵ Pfeiffer, Feurlein and Brenk-Schulte¹⁹ use the term "willingness" to characterize an array of variables thought to influence entry into and retention in treatment.

THE ASSET PROJECT

Arizona Settlement Services for Education and Transition (ASSET) was a three year project funded by the National Institute on Alcohol Abuse and Alcoholism to intervene with homeless adult drug users. Using a modified therapeutic community approach, ASSET's goals were to (1) decrease alcohol and/or drug use; (2) increase employability; and, (3) improve residential stability. The traditional TC model was modified to a 4 month program

and included a residential and non-residential setting. The process of TC treatment remained intact but was accelerated to account for shorter duration of intervention.

The core of the intervention for both the residential and non-residential setting was a curriculum designed to examine, educate and affect substance use, housing and employment. The curriculum provided at least eight hours per week of contact between the homeless person and the intervention staff, allowing for didactic presentations, group work, individual counseling, retreats, community activities and social interaction. The curriculum was delivered by demonstrators trained in TC principles, who were often recovering addicts who completed treatment in a TC. The residential program provided services in a group home while services for the non-residential program were provided at a community center open 14-16 hours a day.

Three assumptions were made by ASSET staff as the intervention was developed and implemented. The first assumption was that the living conditions of a homeless drug user, including drug use, alcohol use, unstable housing and/or lack of income would influence his/her perceived willingness for treatment. The second assumption was that perceived willingness for treatment would relate to length of time in treatment. The last assumption was that living conditions on entry in ASSET, perceived willingness on entry and time in treatment would influence living conditions after leaving ASSET. This paper reports on analyses testing those assumptions.

METHODS

Sample: Eligibility criteria for ASSET were (1) at least 18 years of age; (2) homeless as defined by the McKinney Act; (3) reported an alcohol and/or drug problem; (4) did not use psychotropic medications; and, (5) agreed to random assignment to the residential or non-residential program. A non-equivalent comparison group, who met eligibility criteria one through four but refused treatment with ASSET, was also recruited.

Homeless adult drug users were recruited through street outreach, presentations to clients at homeless shelters, referrals from social service agencies, referrals from the criminal justice system, and by self-referral. Screening for eligibility occurred at the point of initial contact and was done by either intervention or research staff. Homeless persons not meeting eligibility criteria were told of other treatment services available in the community. Homeless persons, who met criteria, were informed of ASSET's research and intervention protocols. If an individual chose not to participate in

the intervention, she/he was told about the comparison group and encouraged to take part in the research. This project was approved by the Institutional Review Board, University of Arizona.

Three hundred and fifty-eight homeless adults participated in the intervention and 136 in the comparison group. Sociodemographic characteristics for the intervention and comparison groups were similar. For the total sample, 89% were male; approximately 65% were less than 40 years of age; and, 40% were minorities including Blacks, Native Americans and Mexican Americans. Alcohol was the most problematic substance for over half of the sample followed by crack/cocaine use (30%). Most (60%) drank alcohol more than 10 days out of the last 30 days. Approximately 35% had never received alcohol treatment and over 50% never received drug treatment. Approximately 66% had not worked in the last month. On the average, the sample had stable housing for only 10 out of the previous 60 days. Half of the sample had been homeless twice in their lifetime and once in last five years.

Procedures: Once the choice to participate in the intervention or the comparison group was made, baseline interviews were conducted. Eligible persons agreeing to treatment were told that responses to the questionnaires would not influence their acceptance into the program nor their random assignment to the residential or non-residential setting. All questionnaires were administered by trained interviewers. No data were shared with the intervention staff.

Follow-up interviews were conducted at two, four, seven, ten and thirteen months after baseline. Intervention and comparison group members were paid \$10.00 for time spent in the baseline interview and up to \$25.00 for the follow-ups.

Measures: For data reported here, De Leon and Jainchill's²⁰ Motivation, Readiness and Suitability Scale (MRS) measured perceived willingness for treatment at baseline. Living conditions at baseline and at follow-up were measured using single items and a composite score from the Addiction Severity Index²⁶ and a composite score from the Personal History Form.²⁷ Length of time in treatment (retention) was measured as the number of days in ASSET from enrollment to discharge or drop out. Participants received no ASSET services after discharge (defined as completion of program) or drop out (defined as missing five or more continuous days of the program).

The MRS is a 42 item, five point Likert scale anchored with responses "strongly agree" and "strongly disagree". In ASSET, each item was read by an interviewer and the participant answered using one of the five possible responses or indicated "not applicable." The motivation subscale (17

items) measures internal reasons for change that can be positive (e.g., “I know I have to make changes in myself to get my life together”) or negative (“I am afraid I will end up dead if I don’t stop drinking or using drugs”). The readiness subscale (nine items) measures perceived need for formal treatment as opposed to self-directed change or assistance from significant others. A typical item in the readiness subscale is “Basically, I don’t see any other choice for help at this time except some kind of treatment.” The suitability subscale (16 items) measures an individual’s perception of the appropriateness of the TC treatment model for him/herself. Example items for suitability are “I am willing to sever street ties for awhile if it will help me in treatment” and “I really do need to be completely alcohol/drug free in order to live successfully.” The MRS is summated for a total scale score and for three subscale scores.

De Leon and Jainchill’s Circumstances Subscale (CS), which measures losses (such as in relationships, family, support, job, school status or money) and fears (such as jail, injury, violence, suicide and death) was not used. Many homeless adults have already experienced those losses and lived with those fears. The CS, as constructed by De Leon and Jainchill, would not likely be sensitive to the losses and fears that drive homeless adult drug users to treatment.

In the initial test of the CMRS, De Leon and Jainchill²⁰ reported that seven items on the motivation subscale, seven items on readiness and eight items on suitability correlated significantly with 30 day retention in a residential TC. Smith and Simpson²⁸ found adequate reliability for the CMRS and three factors which were consistent with the conceptually defined domains.

Using the Addiction Severity Index (ASI), frequency of drug use was measured by summing responses to questions on consumption of ten street drugs including marijuana, cocaine, crack, heroin, opiates, hallucinogens, inhalants, barbiturates, sedative, and amphetamines. Each question asked “In the last 30 days, how many days did you use (name of drug)?” Possible responses for this measure were from zero to 300, ranging from no use of street drugs to use of all drugs on all 30 days. Using the same 30 day drug consumption question, days of any alcohol use were recorded. Responses from the ASI to “In the last 30 days, how many days were you paid for working?” measured employment.

To measure housing status, a composite from the Personal History Form (PHF) was created. The PHF asks “How many nights in the past 60 nights did you stay at (some location)?” Nights spent at locations that implied a housed condition (such as in own SRO, own domicile, parent/

guardian's domicile, treatment program, recovery program, or correctional facility) were summed.

Drug and alcohol use as well as employment and housing status were measured at baseline. Outcome measures for the four variables were computed by subtracting the baseline score from a follow-up score. Thus, an outcome was change in the frequency of a behavior. Desired outcomes of ASSET would be less drug and alcohol use as well as more days housed and employed at follow-up.

Not all treatment and comparison group members completed the follow-ups as scheduled. To obtain a follow-up measure on as many people as possible, scores on the seven month follow-up interview were used if available. If the seven month follow-up interview was not done, scores obtained from the ten month were used or if the ten month was not available, the 13 month interview was used. Under these conditions, 239 (54%) persons had follow-up measures and 202 (46%) had no follow-ups.

Statistical Analyses: The two statistical software packages used in these analyses were EQS²⁹ and SAS.³⁰ The data were subjected to a multivariate causal analysis using factor analytic structural equations modeling. A factor analytic structural equations model consists of two major components, a "measurement" model and a "structural" model. The measurement model is essentially confirmatory factor analysis, wherein a number of directly observed variables (indicators) are related to a smaller set of hypothetical constructs (latent variables or common factors) presumed to be underlying the correlations between them. For the purposes of this study, this procedure is superior to traditional exploratory factor analysis in that the exploratory procedure derives the multivariate constructs empirically from the correlations between indicators. Thus, exploratory factor analysis runs the risk of capitalizing upon chance associations and of equivocal *post hoc* interpretation of the factors.³¹ Exploratory factor analysis is better suited for the generation rather than the testing of hypotheses. Instead, confirmatory factor analysis (CFA) permits the theoretical specification of the latent constructs as *a priori* hypotheses to be tested against correlational data. By the exclusive prior assignment of each indicator to theoretically specified constructs, CFA also reduces the number of factor loadings needed and thus, enhances the efficiency of parameter estimation. Because of multicollinearity, common factors were constructed for the three hypothetical latent variables of motivation, readiness and suitability.

Specifically, CFA tested the hypothesis that motivation, readiness and suitability were indeed well formed by the items in the scale. Since motivation, readiness and suitability were hypothetically correlated, the three

factors were then considered for a higher order factor. The higher order construct was labelled willingness for treatment.

The structural component of the model is essentially a path analysis between the latent constructs that were produced by the factor analysis. Path analysis or structural equations modeling consists of imposing a restricted set of causal pathways, also specified *a priori*, and testing them against the correlations between constructs. Structural equations modeling permits the modeling of factor intercorrelations by any combination of direct, indirect, spurious and residual effects.³²

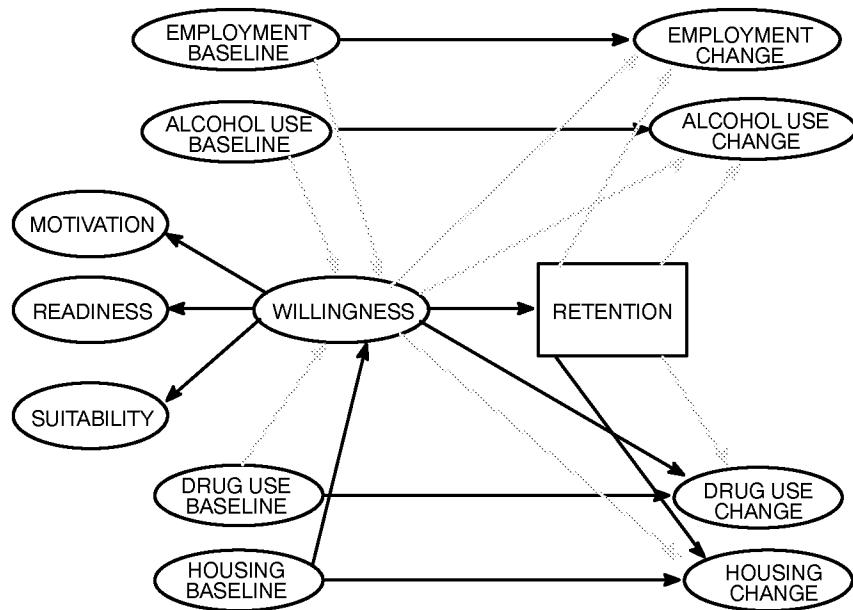
In this study, the hypothesized direct effects were from the baseline score on a variable to willingness, from willingness to retention, from willingness to the change score at follow-up, from retention to the change score, and from the baseline to the change score. One hypothesized indirect path was from willingness through retention to each change score. This path analysis consisted of a multisample Generalized Least Squares causal model. Multisample analysis was required because follow-up data were missing on many subjects. Instead of deleting those cases with missing data, a simultaneous analysis kept those missing cases in and made the factor loadings as well as path coefficients equal for both follow-up and no follow-up groups. The Lagrange multiplier test was used to confirm that the constraints were equal to each other for the two groups.

To confirm that the group with follow-up data and the group without were similar for all baseline measures, a series of ANOVAs was run. ANOVA tested differences in means on baseline scores, motivation, readiness, suitability, and willingness for the two groups. For these univariate analyses, the factor scores were estimated by unit weighting.³¹ PROC STANDARD in SAS was used to standardize the items. Next, the standardized items were averaged to get an estimate of the three lower order factors of motivation, readiness and suitability. The three lower order factors were then standardized and averaged to yield the higher order factor of willingness.

RESULTS

The Final Model: Figure 1 displays the factor analytic structural equations model. In this figure, the statistically significant causal pathways ($p \leq 0.05$) are represented as solid arrows while the nonsignificant causal pathways are represented by broken arrows. Both factor loadings and causal pathways are expressed as standardized regression coefficients (beta weights). The chi-square value for this model was 3014.608 ($df = 2294$) and was statistically significant ($p < 0.001$), indicating that the model did

FIGURE 1. Factor analytic structural equations model for baseline scores on four behaviors, motivation, readiness, suitability, willingness, retention, and change scores at follow-up, including significant and nonsignificant pathways.



not perfectly predict all the covariances between the variables. However, all three of the practical fit indices for the model were highly acceptable. The normed Bentler-Bonett Fit Index was 0.983, the nonnormed Bentler-Bonett Fit Index was 0.996 and the Comparative Fit Index was 0.996. Such indices of fit exceeding 0.90 are considered acceptable for practical purposes.³³ The substantive aspects of this model are now discussed.

The Measurement Model: Lower order common factors were constructed for the motivation, readiness and suitability subscales of the MRS. Table 1 presents a summary of the findings. In this table, the content of an item is reflected in two or more key words. For motivation, loadings for the 17 items ranged from -0.006 to 0.882 with one item having a negative and 16 items having positive correlations with the factor. For readiness, factor loadings of the nine items ranged from 0.610 to 0.948 . For suitability, loadings of the 16 items ranged from 0.280 to 0.867 . All positive factor loadings or correlations were statistically significant.

TABLE 1. Item Loadings on Motivation, Readiness and Suitability.

	<u>Motivation</u>	<u>Readiness</u>	<u>Suitability</u>
<u>Item Content</u>			
Serious Problem	0.882		
Cause Of Problems	0.735		
Stay Off Drugs	0.805		
Don't Like Self	0.796		
Can't Control Life	0.818		
Life Worse	0.813		
End Up Dead	0.737		
Make Changes	0.682		
Important To Stop	0.850		
Make Changes	-0.006		
Other Problems	0.371		
Family Pressure	0.566		
Family Influence	0.759		
Continue Use	0.820		
Drugs No Problem	0.620		
Lost Everything	0.652		
Hurt People	0.647		
Stop Anytime		0.699	
Ready For Treatment		0.822	
Do Anything		0.706	
No Other Choice		0.902	
Need Treatment		0.856	
Try Other Treatment		0.610	
Can't Do Myself		0.861	
Enter Soon		0.948	
Another Chance		0.621	

TABLE 1 (continued)

	<u>Motivation</u>	<u>Readiness</u>	<u>Suitability</u>
Sever Family Ties			0.683
Sever Street Ties			0.867
Right Approach			0.805
New Environment			0.700
Change Attitude			0.688
Drug Free			0.884
Other Treatment			0.280
Sacrifices To Stay			0.496
No Serious Problems			0.698
Change A Lot			0.381
Stay Away From Users			0.754
Tried Other Treatment			0.301
Need This Program			0.832
Fears About Program			0.386
Demands Of Program			0.452
Stay Long			0.718

CFA confirmed the hypothesized factor structure of the MRS. Pearson correlation coefficients between the motivation, readiness and suitability subscales were all greater than 0.79 and significant at a p value less than 0.000. Similarly, correlations between each subscale and the total MRS scale were high ranging from 0.85 to 0.94. The factors labelled motivation, readiness and suitability that were identified in CFA were also correlated. The motivation factor correlated to the readiness factor at 0.58 and to the suitability factor at 0.55. The readiness factor correlated at 0.90 with the suitability factor. This pattern of relationships suggested that the three subscales were tapping into another common factor.

CFA confirmed the higher order factor (see Figure 1). Loading of the motivation factor on the higher order construct was 0.947. Loading of the readiness factor was 0.981 and suitability factor was 0.981 on the higher order construct. The higher order construct was labelled willingness to encompass motivation, readiness, and suitability.

The very high, nearly perfect, correlations between the three lower order factors and the higher order construct provide strong evidence against the discriminate validity of the three separate subscales. Parsimony also advocates for the use of only the higher order construct in analyses. The structural model discussed below used willingness as a predictor of retention and project outcomes.

The Structural Model: The structural model linking baseline measures on four behaviors, willingness, retention and changes in the four behaviors at follow-up is shown in Figure 1. For the full structural model, eight out of the 17 hypothesized direct causal pathways were statistically significant. Two hypothesized indirect paths to the change scores were also significant. The structural model is now discussed looking at pathways from left to right.

Only one significant relation was found between a behavior at baseline and willingness. For the homeless drug user, more stable housing at baseline increased his/her willingness for treatment. Days of employment, alcohol use or drug use at baseline had no relation to willingness.

For each of the four behaviors, there was a significant, negative causal pathway from baseline to the change score at follow-up. This finding suggested that the higher the frequency of a behavior at baseline, the smaller the change at follow-up. Thus, the more employment days reported at baseline, the less change in employment at follow-up from that baseline score. Similar statements can be made for the relationship of baseline alcohol use, drug use or days housed to its change score.

A significant, positive path from willingness to retention implied that the more willing the homeless drug users were for treatment at baseline, the longer he/she stayed in ASSET. Willingness also had one significant direct path to change in behavior. More willingness for treatment at baseline related to more change in drug use at follow-up.

Although mediated by retention, willingness had an effect on housing change. This indirect pathway suggested that the more willing a homeless drug user was at baseline, the greater the housing change at follow-up. Willingness had no other significant direct or indirect effects on the four change scores.

Longer retention related directly to more change in days of stable housing. Contrary to our expectations, retention or length of time in treatment had no direct effect on change in employment, alcohol use or drug use at follow-up.

This multivariate causal model explained 23% of the variance for change in employment, 61% for change in alcohol days, 67% for change in drug days and 37% for change in housing. The Lagrange multiplier tests were

all nonsignificant confirming equality constraints. The ANOVAs found no significant differences between groups with and without follow-up data for the baseline measures.

DISCUSSION

The purpose of this study was to test assumptions made in the development and implementation of the ASSET project. Program staff hypothesized that pre-existing living conditions of homeless adult drug users would influence their perceived willingness for TC treatment as well as outcomes of treatment. Willingness, specifically motivation, readiness and perceived suitability for treatment, would influence length of time in ASSET and treatment outcomes. Lastly, length of time in treatment would influence outcomes. Data were subjected to a multivariate causal analysis using factor analytic structural equations modeling. From this analysis, several hypotheses were supported.

The measurement model confirmed the hypothesized factor structure of De Leon and Jainchill's Motivation, Readiness and Suitability Scale (MRS) but found no discriminate validity among the three subscales. A higher order factor, labelled willingness, fit the observed data well. From the structural model, willingness had a significant, positive relationship to retention. This finding is consistent with the literature on motivation and time in treatment.²¹⁻²⁵ The strength of the relationship found in this study is slightly larger than correlates reported previously for long term residential treatment.²⁰⁻²¹

Willingness had strong evidence for its construct and predictive validity. The composite MRS scale may be useful in screening applicants for TC treatment and perhaps, in monitoring intent to stay in treatment for program participants. From other analyses of the ASSET program, the non-equivalent comparison group had lower scores on the MRS than those entering treatment; and, ASSET participants who stayed in treatment longer than 30 days had higher MRS scores than those dropping out before one month.³⁴ In ASSET, willingness was measured only at baseline. However, qualitative research findings from our study suggest that willingness changes during treatment and may intensify, diminish or remain stable over time.³⁴ Those homeless adult drug users maintaining low levels of willingness or reporting less willingness as treatment time increased were more likely to drop out. Large scale, prospective studies of willingness on entry and during TC treatment are needed.

The structural model supported several hypothesized relationships. Only one baseline living condition, nights of stable housing positively influenced

willingness for TC treatment. More hypothesized causal pathways were significant for change in housing than for the other three outcomes. Baseline score for housing as well as retention directly influenced housing change. Likewise, a path from the baseline score to willingness continuing through retention significantly influenced housing change. These findings are reasonable given that homelessness was the primary criterion for entry into ASSET. Housing, a basic human need, was the overwhelming reason our sample sought TC treatment. For those homeless drug users who experienced stable housing in the previous sixty days, the drive to continue a housed condition was high. Drug use, alcohol use and unemployment may have been secondary considerations in seeking treatment. Another explanation could be that the actual problems associated with the other three behaviors at baseline were less than those related to homelessness. Merely the presence, not the degree of a perceived drug and/or alcohol problem, met eligibility criterion. Unemployment was not a necessary criterion for entry into ASSET. The homelessness of these adult drug users limits generalizability of these findings. Drug users, who have met their basic need for stable housing, might view alcohol use, drug use and/or employment issues as strong primary reasons for seeking TC treatment.

Structural modeling found significant, negative relationships between baseline and change on employment, alcohol use, drug use and housing. Two explanations should be considered. First, it is not unreasonable to argue that homeless adults with more problems at baseline (less days employed, more alcohol use, more drug use, less housed) would be less likely to substantially change their living conditions during the time to follow. Also, it is not unreasonable to hypothesize that homeless adults with fewer problems would be more likely to change over time. The second explanation is regression towards the mean which may be evidenced by inflated negative autoregression effects between baseline and change scores. Since our findings demonstrated negative effects, regression towards the mean cannot be ruled out entirely. Nevertheless, its existence as a partial explanation of the structural relations between our baseline and change scores would not compromise our major conclusions. This study was explicitly modeled as a non-equivalent groups design.³⁵ All treatment effects were statistically controlled for the effects of baseline scores, whether extreme or otherwise. Furthermore, the effects of other baseline measures on willingness were also assessed. Thus, if regression towards the mean did occur, it could have no biasing effect upon our principal findings.

In the structural model, retention had no significant path to employment, alcohol or drug change at follow-up. This finding may imply that treatment had no influence on these outcomes but that interpretation is

incorrect. Rather, retention in treatment had no effect on outcomes. This finding has two possible explanations. First, the curriculum used in the ASSET intervention was delivered over a four month period of time. Homeless drug users entering ASSET began the curriculum not at its start but at a point in its cycle. Each drug user probably had a slightly different start on the curriculum and depending on length of time in the program, different experiences in treatment. Thus, retention and treatment content interact in influencing outcomes. The relationships among retention, treatment characteristics and outcomes need examination. The second explanation for retention failing to correlate with three outcomes regards the TC process used in this program. ASSET modified the traditional TC by shortening the time in treatment, accelerating the process and working in a non-traditional setting. Possibly one or more of these modifications changed the TC treatment process enough so that significant effects on alcohol and drug use could not be achieved in four or fewer months. This explanation is being explored in the ASSET data.

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