The influence of socio-motivational factors on live stream consumption

The report is structured as follows.

Contents

Scales Development

Three indicators were used to assess constructs' validity, two for convergent and one for discriminant validity. In addition, two indicators were used to assess the scales' internal consistency (Table below).

Indicator of convergent validity	**Definition**	**Rules of thumb**
Factor loadings (λ)	Correlation between the original variables and the factors, and the key to understanding the nature of a particular factor. Squared factor loadings indicate what percentage of the variance in an original variable is explained by a factor.	In the case of high convergent validity, high one-factor loadings would indicate that they converge on a common point, the latent construct. At a minimum, all factor loadings must be statistically significant. Because a significant load can still have quite weak strength, a good rule of thumb is that standardized loading estimates should be 0.5 or higher and ideally 0.7 or higher.
AVE	A summary measure of convergence among a set of items representing a latent construct. It is the average percentage of variation explained (variance extracted) among the items of a construct.	An AVE of 0.5 or higher is a good rule of thumb suggesting adequate convergence. An AVE of less than 0.5 indicates that, on average, more error remains in the items than variance explained by the latent factor structure imposed on the measure.
Indicator of discriminant validity	**Definition**	**Rules of thumb**
AVE and correlations (p)	The squared variance extracted estimates for a construct should be greater than the correlation estimates between this and other constructs.	Squared AVE > p (Fornell & Larcker, 1981).
Indicator of internal consistency	**Definition**	**Rules of thumb**
Construct Reliability (CR)	Measure of reliability and internal consistency of the measured variables representing a latent construct. Must be established before construct validity can be assessed. It is	0.7 or higher suggests good reliability. Reliability between 0.6 and 0.7 may be acceptable, provided that other indicators of a model's construct validity are good.

	computed from the squared sum of factor loadings for each construct and the sum of the error variance terms for a construct.	
Cronbach's Alpha	Cronbach's Alpha is a coefficient that represents the proportion of total variance among items that are due to the construct that they intend to measure	0.7 is the minimum acceptable level (Pallant, 2010).

The first phase of the analysis was to test the reliability and validity of scales and, if needed, perform scale purification measures. Reliability tests were executed considering all items of each one of the six socio-motivational scale. Reliability is an assessment of the degree of consistency between multiple measurements of a variable. One form of reliability is test–retest, by which consistency is measured between the responses for an individual at two points in time. The objective is to ensure that responses are not too varied across time periods so that a measurement taken at any point in time is reliable.

A second and more commonly used measure of reliability is internal consistency, which applies to the consistency among the variables in a summated scale. The rationale for internal consistency is that the individual items or indicators of the scale should all be measuring the same construct and thus be highly intercorrelated (Hair et al., 2014). The analysis in this study was done using Cronbach's Alpha.

Entertainment did not achieve an acceptable Alpha ($\alpha = .449$). A close examination of the Item-Total Correlations suggested no clear offending items to be removed. So all items were included on the next phase (confirmatory factor analysis - CFA) to examine further. A correlation matrix was generated (table below). The only correlation above .400 was between items ET2 and ET4.

Variable		ET1	ET2	ET3	ET4	ET5
ET1	Pearson Correlation	1	.211**	.371**	.153**	.160**
	p		.000	.000	.006	.004
	N	319	318	318	319	318
ET2	Pearson Correlation	.211**	1	.058	.488**	-.006

	p	.000		.303	.000	.915
	N	318	318	317	318	317
ET3	Pearson Correlation	.371**	.058	1	.089	.108
	p	.000	.303		.114	.055
	N	318	317	318	318	317
ET4	Pearson Correlation	.153**	.488**	.089	1	.008
	p	.006	.000	.114		.893
	N	319	318	318	319	318
ET5	Pearson Correlation	.160**	-.006	.108	.008	1
	p	.004	.915	.055	.893	
	N	318	317	317	318	318

**. Correlation is significant at the 0.01 level (2-tailed).

A Principal Component Analysis with Varimax Rotation suggested two different components following the criteria of *eigenvalue* higher than 1 (figure below): ET2 correlated with ET4 while ET1 correlated with ET3 and ET5 ($\lambda > .500$).

	Component	
	1	2
ET1	0.256	**0.749**
ET2	**0.858**	0.048
ET3	0.058	**0.759**
ET4	**0.848**	0.019
ET5	-0.135	**0.536**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

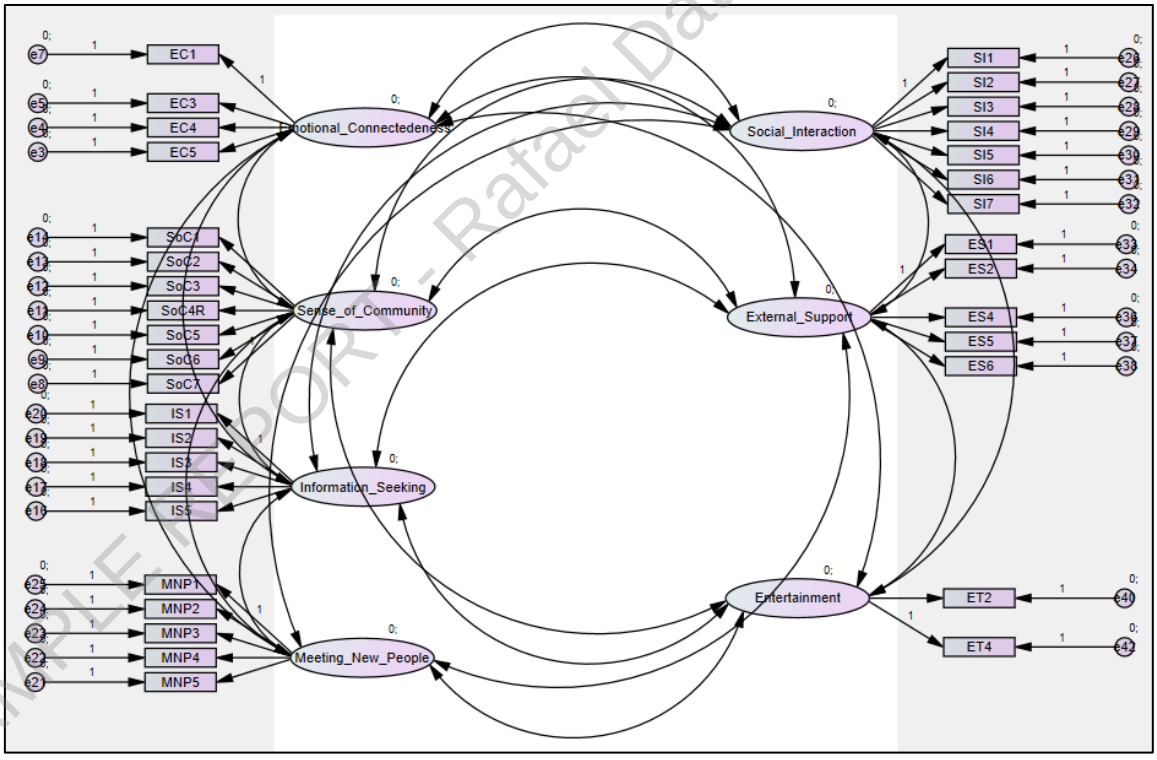
Nevertheless, the decision on which items to retain will be based on a CFA. All other constructs showed acceptable Alphas ($\alpha > .700$). Thus, all items were moved to the second phase: validity analysis with CFA.

The first CFA model (including all items) showed very low factor loadings (Table below).

Item		Construct	λ
EC7	<---	Emotional_Connectedeness	.255
EC6	<---	Emotional_Connectedeness	.273
EC5	<---	Emotional_Connectedeness	.553
EC4	<---	Emotional_Connectedeness	.489
EC3	<---	Emotional_Connectedeness	.909
EC2	<---	Emotional_Connectedeness	.243
EC1	<---	Emotional_Connectedeness	.908
SoC7	<---	Sense_of_Community	.574
SoC6	<---	Sense_of_Community	.740
SoC5	<---	Sense_of_Community	.747
SoC4R	<---	Sense_of_Community	.501
SoC3	<---	Sense_of_Community	.766
SoC2	<---	Sense_of_Community	.837
SoC1	<---	Sense_of_Community	.750
IS6	<---	Information_Seeking	.276
IS5	<---	Information_Seeking	.863
IS4	<---	Information_Seeking	.861
IS3	<---	Information_Seeking	.671
IS2	<---	Information_Seeking	.449
IS1	<---	Information_Seeking	.642
MNP5	<---	Meeting_New_People	.826
MNP4	<---	Meeting_New_People	.765
MNP3	<---	Meeting_New_People	.848
MNP2	<---	Meeting_New_People	.870
MNP1	<---	Meeting_New_People	.913
SI1	<---	Social_Interaction	.857
SI2	<---	Social_Interaction	.881
SI3	<---	Social_Interaction	.789
SI4	<---	Social_Interaction	.891
SI5	<---	Social_Interaction	.821
SI6	<---	Social_Interaction	.741
SI7	<---	Social_Interaction	.845
ES1	<---	External_Support	.831

ES2	<---	External_Support	.874
ES3	<---	External_Support	.102
ES4	<---	External_Support	.794
ES5	<---	External_Support	.738
ES6	<---	External_Support	.673
ET1	<---	Entertainment	.256
ET2	<---	Entertainment	.722
ET3	<---	Entertainment	.110
ET4	<---	Entertainment	.688
ET5	<---	Entertainment	.015

Items with factor loadings lower than .400 were deleted and a second CFA was conducted. The figure below illustrates the model.



Most of the indicators of convergent validity and internal consistency were satisfactory in this model (Table below). The indicators for 'Entertainment' were slightly below the acceptable levels (AVE = .489; CR = .657; α = .655). However, the construct was retained

for the analysis since it represents a relevant construct to the analysis, The lack of sufficient reliability, however, needs to be taken into account when interpreting the results.

Construct	Item	Loadings	AVE	CR	Cronbach's Alpha
Emotional Connectedness	EC1	.923	.547	.816	.799
	EC3	.916			
	EC4	.472			
	EC5	.523			
Sense of Community	SoC1	.751	.505	.875	.872
	SoC2	.837			
	SoC3	.765			
	SoC4R	.501			
	SoC5	.747			
	SoC6	.740			
	SoC7	.574			
Information Seeking	IS1	.639	.508	.831	.829
	IS2	.431			
	IS3	.667			
	IS4	.864			
	IS5	.870			
Meeting New People	MNP1	.913	.715	.926	.925
	MNP2	.870			
	MNP3	.847			
	MNP4	.765			
	MNP5	.826			
Social Interaction	SI1	.857	.695	.941	.939
	SI2	.881			
	SI3	.789			
	SI4	.891			
	SI5	.821			
	SI6	.741			
	SI7	.845			
External Support	ES1	.831	.616	.888	.835
	ES2	.874			
	ES4	.794			
	ES5	.737			
	ES6	.672			
Entertainment	ET2	.699	.489	.657	.655
	ET4	.700			

After determining convergent validity, the discriminant validity was assessed. The table below shows the squared AVE value (diagonal), along with correlations among constructs, obtained through CFA (non-diagonal values). The correlation between Social Interaction and Sense of Community was higher than the squared AVE of Social Interaction. Sense of Community also correlated slightly higher with Meeting New People in relation to its own AVE. This correlation is also higher than the squared AVE of Meeting New People. Thus, these three constructs cannot be considered totally discriminant from each other. An inspection of an inter-item correlation matrix revealed some high correlations among specific items. The deletion of these highly correlated items did not improve discriminant validity sufficiently. Thus, the first factor-structure was retained for subsequent analyses.

Shared Variance	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Emotional Connectedness (1)	**.74**					
Entertainment (2)	.51	**.78**				
Sense of Community (3)	.52	.43	**.74**			
Information Seeking (4)	.29	.30	.30	**.71**		
Meeting New People (5)	.42	.32	.75	.25	**.71**	
Social Interaction (6)	.41	.34	.91	.23	.74	**.85**

Descriptive Statistics

The tables below show descriptive statistics of the demographic variables and the two live-stream consumption variables that are categorical. 83.4% of the sample is composed by males and 97.8% are from Europe. 69.6% answered 'Discord' to the Reference variable.

Gender	n	(%)	Home	n	(%)	Reference	n	(%)
Male	266	83.4	South America	1	0.3	Discord	222	69.6
Female	47	14.7	Europe	312	97.8	Reddit	6	1.9

Non-binary / third gender	4	1.3	Asia	5	1.6	Twitter	1	0.3
Prefer not to say	2	0.6	Other	1	0.3	Instagram	20	6.3
Total	319	100.0	Total	319	100.0	Direct referral	60	18.8
						Other	10	3.1
						Total	319	100.0

6.9% of the sample has subscribed for more than 24 months to a channel, while 9.4% has donated more than 250.

Longest Sub	n	(%)	Money Donated	n	(%)
None	104	32.6	None	112	35.1
1 Month	23	7.2	0-20	85	26.6
2 Months	14	4.4	20-50	35	11.0
3 Months	27	8.5	50-100	32	10.0
4 Months	21	6.6	100-250	25	7.8
5 Months	10	3.1	250+	30	9.4
6 Months	23	7.2	Total	319	100.0
7-to-12 Months	36	11.3			
13-24 Months	39	12.2			
24+ Months	22	6.9			
Total	319	100.0			

The two tables below show means, standard deviations, skewness and kurtosis values for hours watched, total subs and age. 9.46 hours was the average consumption. The average age of the sample was 20.32, with a standard deviation of 4.8 years.

Variable	n	Mean	Std. Deviation	Skewness	Kurtosis
Live-stream Indicators: Hours Watched	316	9.46	9.038	2.255	7.618
Live-stream Indicators: Total Subs	312	2.83	4.573	3.806	19.488

Variable	n	Mean	Std. Deviation	Skewness	Kurtosis
Age	319	20.32	4.798	2.074	12.720

Socio-motivational explanation of Emotional Connectedness

The first model tested the influence of the socio-motivational factors on emotional connectedness. A Multiple Linear Regression model (MLR) was used and it explained 44.1% of the variance of Emotional Connectedness ($F(6, 311) = 40.18$, $p < .001$). Mahalanobis distances divided by the number of variables revealed six cases with values higher than 4, which can be considered multivariate outliers according to Hair et al. (2014). Since the exclusion of such cases has not changed the conclusions, the cases were kept in the sample. A visual inspection also revealed that they were not aberrant cases, but rather genuine responses. The analysis suggested no substantial multicollinearity as well (VIF < 5.0).

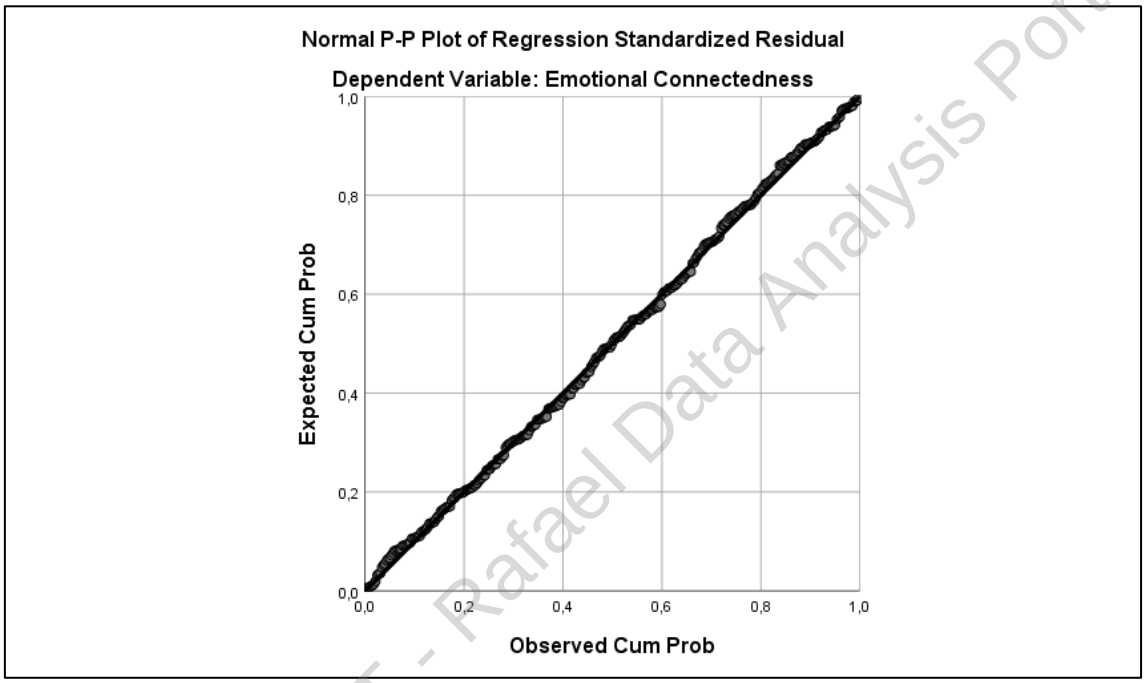
The model coefficients are shown in the table below (in descending order of explanatory power). Sense of Community, Entertainment, Meeting New People, Social Interaction and Information Seeking were significant predictors of Emotional Connectedness. While Social Interaction showed a negative effect on emotional Connectedness, the other indicators had positive effects.

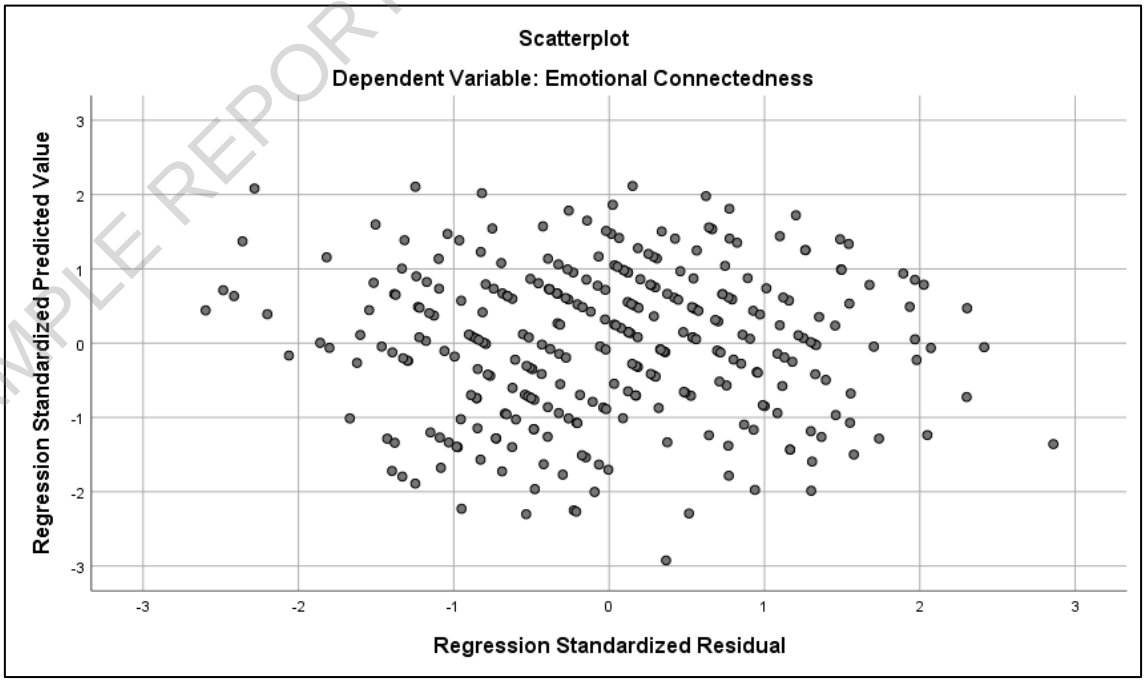
Variable	B (95% CI)	β	sr^2
Sense of Community	0.41 [0.22, 0.6]	.39	.03***
Entertainment	0.40 [0.25, 0.56]	.23	.05***
Meeting New People	0.20 [0.09, 0.3]	.23	.03***
Social Interaction	-0.15 [-0.29, 0]	-.18	.01*

Information Seeking	0.12 [0.02, 0.22]	.11	.01*
External Support	0.08 [-0.08, 0.23]	.09	.00

Note. ***p < .001, **p < .01, *p < .05.

The examination of a P-P plot and a scatterplot of residuals indicate no violations of the assumptions of homoscedasticity, linearity and normality of residuals.





Socio-motivational explanation of Hours Watched

The second model examined the effect of the indicators on the number of hours watching live-stream. An Ordinal Linear Regression (OLR) was used for this purpose.

The model provided good fit to the data (Pearson Goodness-of-Fit test, $\chi2 = 7852.21$, df = 8590, $p = 1.000$) and explained Time watched above the alternate intercept model ($\chi2 = 70.194$, df = 6, $p < .001$), accounting for 20.3% (Cox and Snell Pseudo R^2) of the variance of Time watched. The table below shows the model coefficients. Only Entertainment showed a significant positive effect on Hours Watched of Live stream ($p < .001$).

Variable	Estimate (95% CI)	SE
Sense of Community	0.42 [-0.04, 0.89]	.24
Information Seeking	0.06 [-0.18, 0.3]	.12
Meeting New People	-0.03 [-0.29, 0.22]	.13
Social Interaction	-0.11 [-0.46, 0.24]	.18
External Support	0.38 [-0.01, 0.76]	.20
Entertainment	0.82*** [0.42, 1.22]	.20

Note. ***$p < .001$, SE = Standard Error.

Socio-motivational explanation of Time Subscribed

The third model tested the effects on Time Subscribed. An OLR model demonstrated acceptable fit (Pearson Goodness-of-Fit test, $\chi2 = 2955.56$, df = 2784, $p = .012$), and explained Time subscribed above the alternate intercept model ($\chi2 = 51.91$, df = 6, $p < .001$), accounting for 15.3% (Cox and Snell Pseudo R^2) of the variance in Time subscribed. In this model, none of the socio-motivational indicators were significant predictors of time subscribed (table below).

Variable	B (95% CI)	SE
Sense of Community	0.00 [-0.47, 0.48]	.24
Information Seeking	-0.07 [-0.32, 0.18]	.12
Meeting New People	0.25 [-0.02, 0.51]	.13
Social Interaction	0.29 [-0.07, 0.65]	.18
External Support	0.24 [-0.16, 0.63]	.20
Entertainment	0.15 [-0.26, 0.55]	.20

Socio-motivational explanation of Money Donated

Finally, the last model evaluated the effects on the amount of money donated. The OLR model also showed good fit to the data (Pearson Goodness-of-Fit test, $\chi 2 = 1496.86$, $df = 1544$, $p = .801$) and explained Money Donated above the alternate intercept model ($\chi 2 = 74.28$, $df = 6$, $p < .001$), accounting for 21.2% (Cox and Snell Pseudo R^2) of the variance in Money Donated. Meeting New People was a significant predictor of Money Donated ($p < .05$), along with social interaction ($p < .05$).

Variable	B (95% CI)	SE
Sense of Community	0.24 [-0.25, 0.72]	.25
Information Seeking	-0.14 [-0.4, 0.11]	.13
Meeting New People	0.29* [0.02, 0.56]	.14
Social Interaction	0.39* [0.01, 0.76]	.19
External Support	0.14 [-0.27, 0.54]	.21
Entertainment	-0.11 [-0.52, 0.3]	.21

Conclusions

The table below provides a summary of the hypotheses tested in this study.

Hypotheses	Result
1. Sense of Community is a significant predictor of Emotional Connectedness to the Live-Stream	Confirmed
2. Information Seeking is a significant predictor of Emotional Connectedness to the Live-Stream	Confirmed
3. Meeting New People is a significant predictor of Emotional Connectedness to the Live-Stream	Confirmed
4. Social Interaction is a significant predictor of Emotional Connectedness to the Live-Stream	Confirmed
5. Entertainment is a significant predictor of Emotional Connectedness to the Live-Stream	Confirmed
6. External Support is a significant predictor of Emotional Connectedness to the Live-Stream	Rejected
7. Sense of Community is a significant predictor of the number of hours watched	Rejected
8. Information Seeking is a significant predictor of the number of hours watched	Rejected
9. Meeting New People is a significant predictor of the number of hours watched	Rejected
10. Social Interaction is a significant predictor of the number of hours watched	Rejected
11. Entertainment is a significant predictor of the number of hours watched	Confirmed
12. External Support is a significant predictor of the number of hours watched	Rejected
13. Sense of Community is a significant predictor of the time subscribed	Rejected
14. Information Seeking is a significant predictor of the time subscribed	Rejected
15. Meeting New People is a significant predictor of the time subscribed	Rejected
16. Social Interaction is a significant predictor of the time subscribed	Rejected
17. Entertainment is a significant predictor of the time subscribed	Rejected
18. External Support is a significant predictor of the time subscribed	Rejected
19. Sense of Community is a significant predictor of the money donated	Rejected
20. Information Seeking is a significant predictor of the money donated	Rejected
21. Meeting New People is a significant predictor of the money donated	Confirmed
22. Social Interaction is a significant predictor of the money donated	Confirmed
23. Entertainment is a significant predictor of the money donated	Rejected
24. External Support is a significant predictor of the money donated	Rejected

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