Question 1

Internal validity of a study: The extent to which the causal claims made in a study can be accepted as true. For example, if I claim that a particular teaching method caused an increase in student grades, I must also ensure that no other factor may be responsible for any observed increase in grades. In other words, I must "control" for all other possible causes.

External validity of a study: The extent to which claims made on the basis of a study can be generalized to the wider population. For example, if I claim that handwritten notes leads to an average increase in student grades based on a particular study, how can I be sure that this is true in general and not simply in the participants in the same. External validity claims can be made on the basis of statistical evidence (that a finding is likely to be true in the wider population at a probability of 0.05, for example) and on the basis of representativeness (that my study population matches a wider population).

Factorial validity of a scale used in a study: The extent to which a particular scale is a good way of measuring a particular construct; if a series of questions do all measure the same underlying concept we would expect that the questions would correlate strongly together.

In all cases, validity is another way of saying that there is good reasons for accepting claims as true.

Question 2

Reliability of a scale: A scale that is reliable should produce more or less the same result for the same person if measured at a different time.

The Cronbach's alpha statistics for this scale is: .71

0.7 is the minimum cut off point expected for psychological scales with more than 3 items. This scale is therefore reliable enough for broader use.

Question 3

Correlation Matrix

Correlations

		Recode Q1	Q02	Q03	Q04	Q05	Q06	Q07	Recode Q8	Q09	Q10	Q11	Q12
RecodeQ1	Correlation	1	.285*	.095	.268*	.140	.104	.200	.297*	.212	-.027	.033	.115
	Sig.		.030	.478	.042	.294	.437	.132	.024	.110	.839	.805	.389
Q02	Correlation	.285*	1	-.093	.100	-.040	.388**	.103	-.009	.146	-.051	.315*	.134
	Sig.	.030		.486	.455	.763	.003	.444	.949	.276	.703	.016	.317
Q03	Correlation	.095	-.093	1	.266*	.327*	.070	.164	.209	.097	.601**	.048	.351**
	Sig.	.478	.486		.044	.012	.603	.220	.115	.468	.000	.721	.007
Q04_	Correlation	.268*	.100	.266*	1	.231	-.038	.360**	.156	.312*	.265*	.150	.463**
	Sig.	.042	.455	.044		.081	.778	.006	.244	.017	.045	.261	.000
Q05	Correlation	.140	-.040	.327*	.231	1	.171	.223	.087	.239	.227	.199	.141
	Sig.	.294	.763	.012	.081		.199	.093	.516	.071	.086	.135	.292
Q06	Correlation	.104	.388**	.070	-.038	.171	1	-.021	.258	.349**	-.021	.096	.135
	Sig.	.437	.003	.603	.778	.199		.874	.051	.007	.874	.472	.312
Q07	Correlation	.200	.103	.164	.360**	.223	-.021	1	-.003	.204	.189	.213	.122
	Sig.	.132	.444	.220	.006	.093	.874		.984	.124	.156	.109	.363

RecodeQ8	Correlation	.297*	-.009	.209	.156	.087	.258	-.003	1	.233	.135	-.015	.109
	Sig.	.024	.949	.115	.244	.516	.051	.984		.078	.314	.913	.416
Q09	Correlation	.212	.146	.097	.312*	.239	.349**	.204	.233	1	.008	.157	.063
	Sig.	.110	.276	.468	.017	.071	.007	.124	.078		.955	.240	.636
Q10	Correlation	-.027	-.051	.601**	.265*	.227	-.021	.189	.135	.008	1	.323*	.212
	Sig.	.839	.703	.000	.045	.086	.874	.156	.314	.955		.013	.110
Q11	Correlation	.033	.315*	.048	.150	.199	.096	.213	-.015	.157	.323*	1	.379**
	Sig.	.805	.016	.721	.261	.135	.472	.109	.913	.240	.013		.003
Q12	Correlation	.115	.134	.351**	.463**	.141	.135	.122	.109	.063	.212	.379**	1
	Sig.	.389	.317	.007	.000	.292	.312	.363	.416	.636	.110	.003	

*. Correlation is significant at the 0.05 level (2-tailed).

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

A principal component analysis suggests 4 factors, with one factor being notably more evident than the other three.

When you looked at the correlation matrix it may be that you mostly saw one factor standing out. (Q 3,5,10,11,12.) The alpha score for this scale is .645, which is too low.

One problem with attempting factor analysis on this data is the sample size is too small. Normally you would try to have at least 10 participants for every question in the scale. The measures of sampling adequacy suggest that the same size here is a bit lower than optimal.