MSiA 421, Data Mining

1. (27 points) What are the rewards for listening to music? A sample of American adults (age 18 or over) was asked the extent to which they agree or disagree with the following items:

   Q28* I enjoy talking about music or bands with my friends

   Q29* I like for other people to know which music I listen to

   Q30* I sometimes play or share certain songs with others so that they will understand me better

   Q31* I carefully choose the music to have on in the background when I am with my friends

   Q32* I like to give advice and recommendations to my friends about new bands or songs

   Q33* I like to wear t-shirts or other clothing with the logo or name of my favorite bands or musicians

   Q34* I often "like" bands or musicians on Facebook

   Q35 I like to have music on in the background while I'm doing other things

   Q36 I feel energized after listening to music

   Q37 I lose myself in the pleasure of listening to my favorite music

   Q38 I often unwind and relax by listening to music

   Q39 Listening to music is an escape

   Q40 Some songs definitely affect me emotionally

   Q41 I feel less stress after listening to music

   Q42 When I listen to music I am worry-free

   Q43* Part of my role among friends is to keep them informed about new music or when bands will be touring

   Q44 Music sometimes touches me deep down

   Q45 Some songs send shivers up my spine or give me goose bumps

   Q46* I like to discuss my favorite bands and music on social media site

   Q47* I enjoy following certain bands or musicians

   Q48 I do other things better when I have music on in the background

   Q49 I sometimes feel like crying after listening to certain songs

   Q50* Being a fan of certain bands is a little like belonging to a club

   Q51 Listening to certain music leaves me with a good feeling

Q52* My knowledge of music and bands makes me a more interesting person to others

Q53 I can become so absorbed in music that I forget the world around me

Q54 Listening to some songs makes me laugh out loud

Perform an exploratory factor analysis of the 27 questions to identify latent variables using either PCA or ML factor analysis. We would like to have as many factors as possible, but you should have (1) at least three items loading on each factor (three measures of each latent variable); (2) minimal large cross loadings (most less than, say .4); (3) alpha greater than 0.8. You should answer the following questions:

(a) (3 points) How many factors should be used? Explain your rationale.

(b) *For each factor* (i.e., if you suggest 8 factors then you need to answer this part 8 times), state which items (questions) should load on the factor. List the question numbers of the questions assigned to a factor in numerical order. Hints: you will need to "purify" the measure by possibly dropping some of the variables that "load" on a particular factor in the EFA. Some of the considerations include discriminant validity (large cross-loadings diminish this), content validity, face validity and reliability. Don't be afraid to prune items aggressively!

(c) Name each factor with at most, say, five words. The factor names should accurately describe the latent variable being measured.

(d) Give the reliability of each scale (as measured by coefficient alpha). Does alpha improve when items are dropped?

(e) Provide the varimax rotated loadings of your final set of items. Also give the eigenvalues.

(f) Estimate scores for your factors, allowing them to be correlated (this can be done either with a promax rotation or by averaging the raw items—you might want to try both to see if you get the same conclusion!). Submit a correlation matrix. (Note: my correlations with promax range from .34 to .58, and are slightly larger with the simple averages. If yours are larger than this then you probably have items with large cross loadings, and you may encounter multicollinearity problems.)

(g) The `time1` variable gives the length of time that the respondent spends listening to music (consumption). Regress `time1` on your factors and discuss which factors are most predictive of consumption.