

SOCIAL CAPITAL AND MUSIC DISCOVERY: AN EXAMINATION OF THE TIES THROUGH WHICH LATE ADOLESCENTS DISCOVER NEW MUSIC

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ABSTRACT

Research on everyday life information seeking has demonstrated that people often relied on other people to obtain the information they need. Weak ties (i.e., acquaintances) were found to be particularly instrumental to get new information. This study employed social network analysis to examine the characteristics of the ties through which late adolescents (15-17 years old) discover new music. In-depth interviews with 19 adolescents were conducted, which generated a sample of 334 ties. A statistical analysis of the ties showed that these adolescents relied mostly on strong ties to expand their music repertoire, that is, on people to which they felt very close and with whom they had frequent contacts. These ties were predominantly homophilous in terms of age, gender and musical taste. It was also found that parents were more likely than friends or other types of kins to be instrumental for music discovery. These findings suggest that a better knowledge of the characteristics of the ties through which people discover new music could provide useful insights for the design of recommender systems that include social networking features.

1. INTRODUCTION

Social psychology of music has long informed us that music practices are inherently social: the social context molds how people perceive, experience or engage with music [12]. Cultural taste and especially musical taste often serve as a mean of distinction and prestige [1]. One's music preferences reflect who one is or aspire to be. Therefore, it would be difficult to predict one's musical taste solely by analyzing the objective and intrinsic characteristics of the music one loves. This explains why people often rely on their social network to expand their music repertoire: in addition to considering one's taste when making recommendations, friends and relatives are able to take into account the values, attitudes and beliefs associated with the music.

This also explains why most systems that provide personalized recommendations for music (e.g., *Last.fm*, *iTunes Genius*) or for other cultural items such as books (e.g., *Am-*

azon) or movies (e.g., *MovieLens*), rely on social or collaborative filtering rather than content-based filtering. What allows each of these recommender systems to distinguish itself from others is the algorithm it uses to generate the recommendations and, more specifically, the type of information the algorithm makes use of, which can include implicit feedback (e.g., listening habits, previous purchases) and/or explicit feedback (e.g., user ratings, lists of favorite artists). However, as Celma [2] points out, these systems also have their drawbacks, such as the so called "cold start problem," which applies to both new music and new users, and the difficulty these systems have to provide novel, non obvious recommendations. Possible solutions that have been proposed include the development of hybrid recommender systems that would combine collaborative and content-based filtering [17], and the use of some characteristics of the users that are known to influence musical taste, such as demographic characteristics, socioeconomic background and personality traits [15].

Social network sites might also open new possibilities for generating music recommendations. A site like Facebook already offers several ways for members to express their music preferences, by means of implicit feedback (e.g., the sharing of links to music videos) and explicit feedback (e.g., the list of favorite music in the user's profile, the "like" button that allows users to express interest in a music video shared by another user or in the page of a music artist). In addition to that, Facebook contains extensive information about one's social network which, again, can be explicit (e.g., becoming "friend" with someone, indicating the type of kinship with another user) or implicit (e.g., the strength of a relationship can be estimated by calculating the number of interactions occurring between two members, the number of times they tag each others on pictures and/or the number of networks or friends they have in common). Considering the popularity of social networking sites and the impact of the social context on musical practices, it seems relevant to explore whether relationships characteristics could be exploited to improve social filtering algorithms in music recommender systems that include social networking features.

A first step in that direction is to examine the characteristics of the ties through which people discover new music in everyday life. It is with this objective in mind that this study was designed. Its aim was to study how music information circulates within the social networks of late adoles-

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cents (15-17 years old) and, more specifically, to examine the attributes of the ties that are instrumental (or not) for music discovery. Older adolescents are a particularly interesting population to study. According to a survey conducted for the Pew Internet & American Life Project, it is the age group that shows the highest percentage of social networking sites users [11]. Adolescence is also the period during which people construct their identity, and music plays a central role in that process [12]. Furthermore, late adolescence is critical in the formation of one's taste, since it is the period during which the "crystallization of musical taste" generally occurs [11].

2. RELATED WORK

Previous research has demonstrated that people play an important role in information provision, especially to answer everyday-life information needs [8, 9]. People also rely heavily on their social networks to discover new music [10, 17]. To better understand who people choose to approach to get the information they need, several researchers have adopted a social network perspective and found that weak ties (e.g., acquaintances) were usually more instrumental than strong ties (e.g., kins and friends) to acquire new information [6, 9], which is at the origins of Granovetter's "Strength of Weak Ties" theory [6]. Within the social network approach, the term "social capital" has been used to refer to resources (e.g., information) embedded in a social structure [9].

Social network researchers have established that there was a clear relationship between similarity and association. People tend to interact more with people who have similar demographic characteristics (e.g., age, gender, education, social class), as well as people who share their behavior patterns, values and beliefs (e.g., political orientation) [13]. This is the *principle of homophily*, which posits that "distance in terms of social characteristics translates into network distance, the number of relationships through which a piece of information must travel to connect two individuals" [13]. In other words, homophilous ties are more likely to be strong ties. Granovetter also demonstrated that the stronger the tie between two individuals, the greater the overlap in their social networks. As a result of the homophilous nature of strong ties and the extent of overlap in their social networks, strong ties usually have access or are exposed to similar information. This explains why weak ties were found to be more instrumental than strong ties in the acquisition of new information: not only are they usually exposed to different information, they can also act as a bridge between two groups of densely knit networks of close friends [6].

3. METHODOLOGY

This study is part of a larger project examining the way music information is shared within the social network of late adolescents living in an urban area. Pretest interviews with 6 adolescents were conducted in the summer of 2010.

The main study was conducted in the winter and spring of 2011 and included 19 late adolescents (15 to 17 years old).

3.1 Social Network Analysis

Social network analysis (SNA) was used to study how music information is shared within the social networks of adolescents. SNA focuses on "relationships among social entities, and on the patterns and implications of these relationships," [16] in particular on the flow of resources (e.g., information) among actors. It provides a set of methods and theoretical concepts that can be used to analyze and describe the characteristics of social networks and the ties they are composed of. To perform SNA, an egocentric or personal network approach was adopted, which consists in examining social networks from the perspective of focal persons (the "Egos"). This approach is well suited to populations that are large and difficult to delimit. It contrasts with the whole network approach, which looks at the ties that all members of a well-defined population (e.g., all members of an organization) maintain with each other. Although SNA was first developed and used by sociologists, it rapidly proved its utility in other fields of research, including information science. Its use in this domain was promoted by several researchers, among them Haythornthwaite who explained that "Since information is an important resource, and one that often depends on making and maintaining contact with the right people, a social network approach offers a rich variety of concepts and techniques to describe and explain information access" [7].

3.2 Data Collection

Data were collected during in-depth, face-to-face individual interviews. Different instruments were used to obtain information about the social network of each participant and the way music information is exchanged within the network. We used an adaptation of the social network mapping tool designed by Todd and described in [3], which consists of a set of seven concentric circles at the center of which is the participant (called "Ego"). To fill the map, participants were asked to think about how people were clustered in their life (e.g., school, family, friends from elementary school, friends from summer camp, etc.). These clusters or sectors were put on the map. To elicit the names of the persons to be included on their map (called "alters"), we used three different methods. We used a *name generator*, which consists in asking, for each cluster identified, the names of the people to which they felt close or very close. Participants were also asked to name all people through which they had discovered music in the last year or with whom they often discussed music. Finally, we used a method called *critical incident technique* [4], which attempts to rely on a concrete situation to generate a more accurate report of one's behavior than a hypothetical question would. Participants were therefore asked to recall how they had discovered their favorite artist and to provide a detailed account of the context. To help participants recall the situation, the researcher could ask additional questions, such as "When did you hear the music of that artist for the first time?" "Did someone make you listen to the music of that artist?" or

“Had anyone discovered that artist because of you?” Participants were invited to position all alters generated by any of the three methods on their map, using the seven concentric circles to indicate the degree of emotional closeness with each of them.

Once the map was completed, a questionnaire was administered to the participants to collect information about each alter (e.g., age, gender, school level) and their relationship with him or her (e.g., nature of relationship, frequency of contacts, duration of relationship). Participants were also asked to indicate, on a five-point scale ranging from “very different” to “very similar”, the degree of similarity between themselves and each alter in terms of musical taste. With the objective of estimating the degree of instrumentality of each alter for music discovery, participants were asked to indicate, on a five-point scale ranging from “never” to “very often,” how often they discovered new music because of him or her.

Because of the complexity of the task and the length of the accompanying questionnaire, the interviews with the participants lasted between 61 and 95 minutes (mean=79).

3.3 Participants and Sample Size

Participants were recruited from a public school located in downtown Montréal. This school offers programs in French and English, from kindergarten to grade 11. All 10th and 11th grade students enrolled in the French sector (i.e., 173 students) were invited to participate in the study. Nineteen accepted the invitation, for a response rate of 10.9%. All lived within the greater Montréal area, 14 were female and 5 were male; 12 were in grade 10 and 7 in grade 11. The interviews with the participants elicited the names of 334 alters, which means that our sample was composed of 334 dyads or Ego-alter ties.

4. FINDINGS

Although qualitative data were also gathered during the interviews, the present paper focuses on the analysis of the quantitative data collected via the social network mapping tool and the questionnaire about Ego-alter dyads. More specifically, the analysis focuses on the characteristics of the people and the ties that were considered instrumental for music discovery by the participants.

Each participant named between 8 and 29 alters (mean=18.6; median=17), for a total of 334 alters for the 19 participants. Of the 334 alters, 137 (41%) were not considered instrumental for discovering new music, which means that 197 (59%) were considered instrumental at various degrees. To the question “How often do you discover music because of this person?” participants responded “rarely” for 61 alters (18%), “occasionally” for 61 alters (18%), “often” for 46 alters (14%) and “very often” for 29 alters (9%).

A multinomial logistic regression was performed to examine the attributes of the persons and ties that were perceived as instrumental. Multinomial logistic regressions are employed to handle cases where the dependent variable (in this case, the degree of instrumentality of a tie) is nominal or ordinal and has more than two classes, and the independ-

ent variables are nominal, ordinal and/or continuous. Considering the relatively small size of our sample, we sometimes combined categories to increase the validity of the analysis. For instance, for the instrumental variable, we combined the 4th and 5th points of the five-point scale to create the “very instrumental” category; and the 2nd and 3rd points to create the “somewhat instrumental” category. Categories were also combined for the variables *emotional closeness*, *age* and *frequency of contacts*. Results of the logistic regression analysis are shown in Table 1.

4.1 Strength of Instrumental Ties

The strength of a tie is usually estimated by a combination of factors, including emotional closeness and frequency of contacts. The logistic regression analysis shows that emotional closeness was associated with instrumentality: the odds for a close person (6th and 7th grades of the seven-point scale combined) to be considered very instrumental compared to an acquaintance (1st, 2nd and 3rd grades combined) were increased by a factor of 3.8. Pearson’s chi-square significance test (36.6, $p < 0.05$) also confirmed the correlation between these variables.

The duration of a relationship, on the other hand, was not found to be a predictor of the likelihood of a tie to be instrumental, but the frequency of contacts was. People participants saw at least 3 times a week were 1.6 times more likely to be considered instrumental for music discovery than people they saw less than once a week, and 2.0 times more likely to be very instrumental. A high frequency of mediated contacts (i.e., contacts by phone calls, SMS, chat or email) was also positively related to instrumentality, although this association lost its significance when both levels of instrumentality were considered. In all, we can safely say that ties through which participants discovered new music were mostly strong ties.

4.2 Nature of Relationship and Instrumentality

The nature of the relationship was significantly related to instrumentality. Of special interest is the surprising finding that parents were positively related to instrumentality. Indeed, the odds of a parent being very instrumental were 5.7 times greater than for a friend. To be more specific, fathers seemed to be particularly instrumental. Of the 15 fathers mentioned, all were considered instrumental at various degrees, and 7 were considered very instrumental. Of the 16 mothers, 3 were not considered instrumental and only 4 were considered very instrumental. The grandparents clearly belonged to a different category: the odds of grandparents being instrumental were decreased by a factor 0.03 compared to friends. As for siblings, they were not significantly related to instrumentality. This finding should be interpreted carefully, however. Although the sample size did not allow for the consideration of more specific categories for the logistic regression, a look at the data suggests that younger and older siblings should probably be treated separately. Of the 13 younger brothers/sisters mentioned by the participants, 9 were considered “not instrumental”, 2 were “somewhat instrumental” and 2 were “very instrumental”.

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	Sample %	All Instrumental ^a		Somewhat Instrumental ^b		Very Instrumental ^c	
		Odds ratio (95% CI)	<i>P</i>	Odds ratio (95% CI)	<i>P</i>	Odds ratio (95% CI)	<i>P</i>
Nature of relationship^d							
Friend ^e	58%	1.0		1.0		1.0	
Parent	9%	5.3 (1.6-18.1)	.008**	5.1 (1.4-18.1)	.012*	5.7 (1.5-21.6)	.010*
Sibling	6%	0.6 (0.2-1.6)	.343	0.6 (0.2-1.8)	.352	0.7 (0.2-2.4)	.558
Grandparent	7%	0.03 (0.003-0.187)	<.001**	0.04 (0.005-0.296)	.002**		
Emotional closeness							
Not close ^e	8%	1.0		1.0		1.0	
Moderately close	33%	1.4 (0.6-3.4)	.431	1.3 (0.5-3.3)	.411	1.8 (0.5-6.8)	.011
Close	59%	2.6 (1.1-5.9)	.026*	2.1 (0.8-5.2)	.041*	3.8 (1.1-14.0)	.009**
Duration of relationship							
Less than 2 years ^e	8%	1.0		1.0		1.0	
2-5 years	35%	0.9 (0.4-2.1)	.617	0.7 (0.3-1.8)	.455	1.4 (0.4-5.0)	.571
More than 5 years	57%	0.8 (0.4-1.9)	.764	0.6 (0.3-1.5)	.315	1.4 (0.4-4.6)	.608
Frequency of in-person contacts							
Less than once a week ^e	47%	1.0		1.0		1.0	
1-2 times a week	9%	1.6 (0.7-3.5)	.262	1.6 (0.7-3.8)	.314	1.6 (0.6-4.5)	.375
3 or more times a week	43%	1.6 (1.0-2.5)	.043*	1.4 (0.9-2.4)	.175	2.0 (1.1-3.6)	.028*
Frequency of mediated contacts							
Never ^e	8%	1.0		1.0		1.0	
Occasionally	53%	1.8 (0.8-4.3)	.149	1.8 (0.7-4.8)	.209	1.8 (0.6-6.0)	.304
Often	39%	2.7 (1.1-6.4)	.024*	2.5 (0.9-6.8)	.063	3.0 (0.9-9.8)	.074
Age of alter							
> 50 ^e	11%	1.0		1.0		1.0	
25-49	15%	4.9 (1.9-12.3)	.001**	4.6 (1.6-13.4)	.005**	5.3 (1.5-19.0)	.011*
18-24	6%	5.9 (1.8-19.2)	.003**	5.0 (1.3-19.1)	.020*	7.6 (1.7-34.5)	.009**
15-17	59%	4.4 (2.0-9.3)	<.001**	4.3 (1.8-10.5)	.001**	4.5 (1.5-13.6)	.009**
< 15	9%	1.1 (0.4-3.1)	.909	1.1 (0.3-3.8)	.864	1.0 (0.9-70.1)	.975
Education institution							
Different school ^e	8%	1.0		1.0		1.0	
Same school	33%	2.5 (1.3-4.6)	.005**	1.7 (0.9-3.2)	.136	5.9 (2.2-15.7)	<.001**

*p<.05, **p<.01

^a Alters for which egos answered any value other than “never” to the question “How often do you discover music because of this person?”

^b Alters for which egos answered “occasionally” or “rarely”.

^c Alters for which egos answered “often” or “very often”.

^d Some categories were omitted as they did not include enough data (e.g., cousin, uncle/aunt, teacher, librarian)

^e Reference category for the variable.

Table 1. Logistic regression analysis of the significance of people and relationship characteristics for instrumentality

In comparison, all 6 older brothers/sisters were considered instrumental at various degrees (4 were “somewhat instrumental” and 2 “very instrumental”).

4.3 Characteristics of Instrumental Alters

An examination of the characteristics of the instrumental alters also revealed some patterns. The logistic regression analysis on friendship ties showed that friends who were current schoolmates of the ego were 2.5 times more likely to be instrumental for discovering music than the friends attending a different school. Age was also significantly related to instrumentality. Compared with people over 50, the likelihood of being very instrumental for discovering music were increased by a factor of 4.5 for people in the 15-17 age category, by 7.6 for people in the 18-24 category, and by 5.3 for the people in the 25-49 category.

4.4 Homophily/Heterophily of Very Instrumental Ties

Ties can also be characterized by their degree of homophily or heterophily. To investigate that aspect, we compared the demographic characteristics of participants with those of very instrumental ties, as well as the global characteristics of the sample (see Table 2). When we look at the sample data, we notice that the participants’ social networks were composed of a majority of homophilous ties in terms of age (60% of the alters mentioned were at most 1 year older or younger than the ego) and gender (69% of alters were the same sex than the ego). This is hardly surprising considering that, according to the principle of homophily (see Section 2), people tend to interact more with people who are similar to them. Perhaps of greater interest is the fact that people who were considered by participants as being very instrumental for discovering new music followed almost exactly the same distribution for these variables, which means that instru-

mental ties were also predominantly homophilous in age and gender. That being said, a non-negligible proportion of both the sample ties and the instrumental ties were much older than the ego (24% of all alters and 21% of very instrumental alters were more than 12 years older than Ego). In both cases, these people were mostly family members: Family members represented 93% of the much older alters and 94% of the much older very instrumental alters.

On some aspects, a greater proportion of the ties on which participants relied to expand their music repertoire were homophilous compared to the ties of the whole sample. While 68% of the friends in the sample attended the same school than the ego, 92% of the friends who were very instrumental did. Unsurprisingly, an examination of the data on the similarity of musical taste shows that the distribution of the very instrumental ties was skewed towards the end of the scale whereas the ties of the whole sample seemed to follow a normal distribution. In other words, participants tended to prefer people in their social network who shared their musical taste to get music recommendations. It should be noted, however, that not all alters who had very similar taste than Ego were considered very instrumental (only 67% were), which means that a high degree of similarity in musical taste did not always lead to instrumentality for music discovery.

Overall, very instrumental ties included a similar or greater proportion of homophilous ties compared to all ties of the sample, depending on the characteristics we examine. This contradicts the idea that people tend to rely on weak and heterophilous ties to gain new information.

5. DISCUSSION AND CONCLUSION

The data analysis revealed that discovering new music is dissimilar in many ways from other information-seeking situations. While previous research supports the importance of weak ties in the acquisition of new information, the present study concludes that the late adolescents we interviewed relied mostly on strong ties to expand their music repertoire, that is, on people to which they felt very close and with whom they had frequent contacts. These ties were also predominantly homophilous in terms of age, gender and musical taste, although we highlighted the fact that a minority but significant proportion of the very instrumental alters were much older than the participants. Related to that, we found that parents, and especially fathers, were more likely than friends or other types of kins to be instrumental for music discovery.

The analysis of the qualitative data collected during that project should help better understand these findings. In the meantime, we can provide some potential explanations. Three reasons can be offered for the important role strong ties play in this context. Firstly, adolescents are very exposed to music, mainly because of recent technological innovations. Music is widely available on the Web, legally or illegally, in streaming or for download, making it more accessible than it has ever been. Video-sharing sites such as *YouTube* also offer a wide variety of

	Very instrumental		Sample	
	<i>n</i>	%	<i>n</i>	%
Age				
Younger (more than 1 year)	3	4%	22	7%
Same (\pm 1 year)	48	64%	199	60%
Slightly older (2-12 years)	8	11%	33	10%
Much older (more than 12 years)	16	21%	80	24%
Gender				
Same	22	29%	105	31%
Different	53	71%	230	69%
School (for friends)				
Same	33	92%	105	68%
Different	3	8%	50	32%
Musical taste				
Not similar	2	3%	36	13%
Slightly similar	3	4%	62	22%
Moderately similar	14	19%	77	28%
Similar	34	45%	71	25%
Very similar	22	29%	33	12%

Table 2. Characteristics of very instrumental alters compared to characteristics of ego

music videos, which can easily be shared using social networking sites. In addition, many adolescents have smartphones or portable music players on which they can carry large music collections they can share with their friends: seeing two adolescents splitting earphones to listen to music together is very common. As a result, adolescents who are not highly invested in music might not feel the need to actively seek music recommendations. Secondly, discovering music, although important in the construction of identity in adolescence, is certainly not as crucial in one's life as seeking job- or health-related information when needed. People might therefore be less inclined to make efforts to meet these needs and seek advice from music mavens or from people whose job it is to recommend music (e.g., music store staff, librarians) but are less readily available. Thirdly, because of the subjectivity of music interpretation, as well as the attitudes and values associated with the music, recommending music requires a much better knowledge of the information-seeker than answering other types of information needs does, a knowledge that is difficult to grasp through a short interview. It is therefore plausible that adolescents prefer to rely on strong ties because they consider that people who know them well and know their taste provide more relevant recommendations.

We can also offer different possible explanations for the instrumentality of parents for music discovery. The Strength of Weak Ties theory could shed some light on this phenomenon. Although parents are strong ties, they are more heterophilous than friendship ties. Parents are much older and, as such, have been exposed to music from different periods. Considering that musical taste usually crystallizes in late adolescence, it is likely that the music to which they listen today dates, at least partly, from that period. Were it not for older people in their life, adolescents would possibly not be exposed to this music. However, this does not explain why parents were found to be more instrumental than uncles, aunts, or grandparents. Other explanations could be that they are more accessible and/or that music familiarity often leads to music appreciation [5]. As one participant of our pilot study put it, "The songs you grew up with, whether you want it or not, you always end up listening to them again."

The findings of this research reiterate how complex the task of recommending relevant music is and how intricately bound musical taste is to social context. They suggest that a better understanding of the process through which people discover new music through friends, relatives or other acquaintances could provide some useful insights for the design of music recommender systems that integrated social networking features. Further research is now needed to investigate whether these results can be extended to other late adolescent populations or to older or younger populations.

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6. REFERENCES

- [1] P. Bourdieu: *La Distinction: Critique Sociale du Jugement*, Éditions de minuit, Paris, 1979.
- [2] O. Celma: "Foafing the Music: Bridging the Semantic Gap in Music Recommendation," *Proc. of the Semantic Web-ISWC 2006*, pp. 927-934, 2006.
- [3] W. R. Curtis: *The Future Use of Social Networks in Mental Health*, Social Matrix Research, Boston, 1979.
- [4] J. C. Flanagan: "The Critical Incident Technique," *Psychological Bulletin*, Vol. 51, pp. 327-358, 1954.
- [5] S. Frith: *Performing Rites: On the Value of Popular Music*. Harvard University Press, Cambridge, 1996.
- [6] M. S. Granovetter: "The Strength of Weak Ties: A Network Theory Revisited," *Sociological Theory*, Vol. 1, pp. 201-233, 1983.
- [7] C. Haythornthwaite: "Social Network Analysis: An Approach and Technique for the Study of Information Exchange," *Library & Information Science Research*, Vol. 18, No. 4, pp. 323-342, 1996.
- [8] H. Julien and D. Michels: "Intra-Individual Information Behaviour in Daily Life," *Information Processing & Management*, Vol. 40, pp. 547-562, 2004.
- [9] C. A. Johnson: "Choosing People: The Role of Social Capital in Information Seeking Behaviour," *Information Research*, Vol. 10, pp. 10-1, 2004.
- [10] A. Laplante: "Everyday Life Music Information-Seeking Behaviour of Young Adults: An Exploratory Study," Ph.D. thesis, McGill Univ., 2008.
- [11] A. Lenhart, *et al.*: "Social Media and Young Adults," Pew Internet & American Life Project, 2010.
- [12] A. C. North and D. J. Hargreaves: *The Social and Applied Psychology of Music*, Oxford University Press, Oxford; New York, 2008.
- [13] M. McPherson, *et al.*: "Birds of a Feather: Homophily in Social Networks," *Annual Review of Sociology*, Vol. 27, No. 1, pp. 415-444, 2001.
- [14] S. J. Tepper and E. Hargittai: "Pathways to music exploration in a digital age" *Poetics*, Vol. 37, pp. 227-249, 2009.
- [15] A. Uitdenbogerd and R. V. Schyndel: "A Review of Factors Affecting Music Recommender Success," *Proceedings of the Third International Conference on Music Information Retrieval*, pp. 204-208, 2002.
- [16] S. Wasserman and K. Faust: *Social Network Analysis: Methods and Applications*, Cambridge University Press, New York, 1994.
- [17] K. Yoshii, *et al.*: "An Efficient Hybrid Music Recommender System Using an Incrementally Trainable Probabilistic Generative Model," *IEEE Transactions on Audio, Speech, and Language Processing*, Vol. 16, No. 2, pp. 435-447, 2008.