

1.

(segmentation, targeting, positioning; STP strategy)

(positioning map) STP

가

(Green 1970).

3가 가

2-3 가 2 3

가

/

가 가

가

가

가 가

가

가

가

()

가

(e.g., Elrod

1988; Cooper 1988; Sinha and DeSarbo 1998, Tversky and Sattath 1979).

가

(multidimensional scaling model)

(Green and Wind 1973; DeSarbo and Rao 1984; DeSarbo and Cho 1989).

3가

가

(
; cf. PREFMAP)

가 ,

가 .

가

가

가

가

가

(configural invariance)

(Moinpour et al.

1976; Green et al. 1969).

factor matching

(Peay 1988).

C-match (Cliff 1969),

(1995)

, /

가 .

가

, pick any/N

(

가)

external

2.

2.1

internal

vector (reparameterization) , 가

. (Davison 1983; Green 1972; Carroll and Arable 1980)

가 external

(Green and Wind 1973).

external 가

(Green and Wind 1973; Davison 1983; Coopers and Nakanishi 1983).

external

external

가

2.2

가 가 (Young 1987, Carroll and Arable 1980).

badness-of-fit stress 가 가

1999.9 4

elbow

likelihood

. (Jedidi and DeSarbo 1991; Ramsay

1977; DeSarbo and Rao 1984)

internal
, external

internal
, external

2.3 (degeneracy)

internal 가 /

가

(DeSarbo et al. 1997; DeSarbo and Rao 1984).

stress

external

external

internal 가

(indeterminacy problem)

2.4

가

3가

가

가

가

가

가

factor matching

(Peay 1988; Cliff 1969;

1995). /

가

/

가

/

(Green and Wind 1973; Ramsay

1980).

가

가 가

가

가

가

가

가

0

1

가

가 가

가 가

likelihood

가

가

2.5

/

가

/

가 가

가

가

가

,

.

.

/

가 가

가

가

(DeSarbo and Rao 1984).

.

,

가

.

2.6

latent class

latent class

latent class

(AIC,

CAIC, BIC)

(Grover and Srinivasan 1987; Wedel and DeSarbo 1996).

가

가

,

.

,

.

,

가

가

.

2.7

가 ,

가

가

가

3.

3.1 가

가

가

1)

가

(multinomial

distribution)

(Ramaswamy and DeSarbo 1990;

1999).

2)

(Cooper and Nakanishi 1983).

가

가

가

3)

latent class

가

(Grover and Srinivasan 1987; Wedel and DeSarbo 1996).

4)

5)

가

가

가

3.2

가

I :

J :

S :

K :

$d_{sjt} :$ t s j
 $a_{kt} :$ k s t

$Y_{sk} :$ k s

$X_{jkt} :$ t k j

$e_{sjt} :$ t s j

$C_{ijt} :$ i가 t j (pick any/N)

$S_{ist} :$ t i가 s

i가 t s , t 가 s
 j Euclidean distance

$$d_{sj}^t = \sum_k (Y_{sk}^t + a_{sk}^t - X_{jk}^t)^2 + e_{sj} \tag{1}$$

, Y_{sk} , X_{jkt}

[1] t i가 s , i
 가 j extreme value

$$P_{ij|s}^t = \frac{e^{-d_{sj}^t}}{\sum_j e^{-d_{sj}^t}} \tag{2}$$

가 s conditional (multinomial distribution) 가 i

$$\begin{aligned}
 P_{i|s}^t &= \frac{(\sum_j c_{ijt})!}{\prod_j c_{ijt}!} \prod_j \left(\frac{e^{-d'_{sj}}}{\sum_j e^{-d'_{sj}}} \right)^{c_{ijt}} \\
 &= \frac{(\sum_j c_{ijt})!}{\prod_j c_{ijt}!} \prod_{j \neq J} \left(\frac{e^{-d'_{sj}}}{1 + \sum_{j \neq J} e^{-d'_{sj}}} \right)^{c_{ijt}} \left(\frac{1}{1 + \sum_{j \neq J} e^{-d'_{sj}}} \right)^{c_{iJt}}
 \end{aligned}$$

3)

[3] i가 s unconditional

$$P_i^t = \sum_s S_{is}^t \times P_{i|s}^t \tag{4}$$

가 likelihood

$$\begin{aligned}
 L &= \prod_i P_i^t \\
 &= \prod_i \left(\sum_s S_{is}^t \times P_{i|s}^t \right) \\
 &= \prod_i \left[\sum_s S_{is}^t \times \frac{(\sum_j c_{ijt})!}{\prod_j c_{ijt}!} \prod_j \left(\frac{e^{-d'_{sj}}}{\sum_j e^{-d'_{sj}}} \right)^{c_{ijt}} \right]
 \end{aligned} \tag{5}$$

3.3

latent class E-M likelihood

E(expectation) M(maximization) 가
 가 . E , S_{ist}
 M . M
 E , S_{ist} 가 , kt
 numerical search (Quasi-Newton) [5]
 likelihood log log-likelihood .
 [6] E S_{ist} , [7]
 log-likelihood .

$$S_{is}^t = \frac{S_{is}^t \times P_{i|s}^t}{\sum_s S_{is}^t \times P_{i|s}^t} \tag{6}$$

$$Log L_t = \sum_i Log (P_i^t) \tag{7}$$

, t 가
 C_{ijt} (pick any/N ; [IxJ]) ,
 X_{jkt} ([JxK])가 . M
 , kt ([KxS])가 .

3.4 option

, 가
 local 가 option .
 가 ,
 가 ML 가

3.4.1

가

(1) (random number)

1

(2) K-Means

pick any/N

, 가 , 가

(3) 가 ,

(4) 가 .

3.4.2

, 가 . ,

(1) (random number)

(2) 가 .

가 ,

(3) 가

0

(4) 가 .

4 .

4.1

, 가 ,

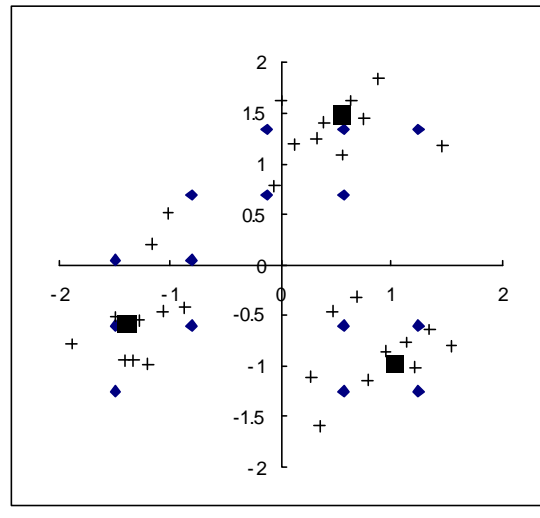
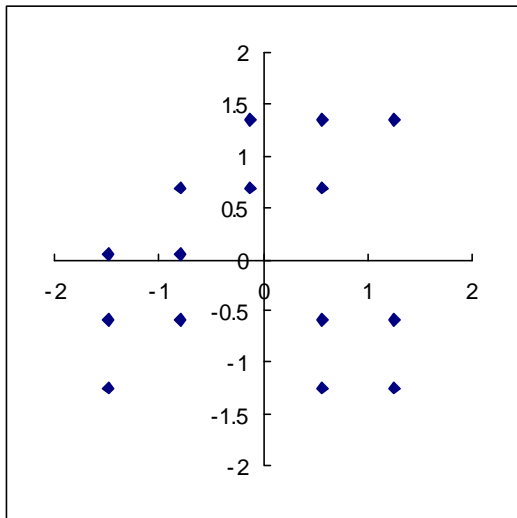
가 , 가 , 가

가 ,
 , 가
 , 가
 , 가
 , 1) 가 , 2) 가
 , 3) 가 , 4) 가

4.2

4.2.1 (t=1)

2 가 가 가
 (15) [1]
 가
 (30) [2] '+'
 가 [2]
 가 가



[1 :] [2 :]

[2] , 가 가 ,

2 4 [1]
CAIC BIC 가 .
CAIC, BIC, AIC 가 .

phi coefficient, total matching coefficient, summed absolute difference (1999; Jedidi and DeSarbo 1991).

SAD

[2] PHI
TMC 1 가 , SAD 0 가
가
PHI TMC 0.7 , SAD 0.15

	-LN	PHI	TMC	SAD	CAIC	BIC	AIC
2	421.6	.543	.758	.410	992.9	958.9	911.2
3	210.5	.874	.944	.084	711.5	645.5	553.0
4	192.9	.923	.967	.078	817.2	719.2	581.8

[1 :]

[2] ,
가 , 가 가
coverage 가
가 , [2] 가
가 .

1	0.056	19.6	22	-2.4	9	0.069	24.1	23	1.1
2	0.088	31.1	29	2.1	10	0.061	21.6	21	.6
3	0.061	21.6	19	2.6	11	0.104	36.7	33	3.7
4	0.065	23.0	23	-0.04	12	0.077	27.2	28	-0.8
5	0.046	16.3	17	-0.72	13	0.063	22.2	25	-2.8
6	0.023	7.9	10	-2.1	14	0.087	30.7	27	3.7
7	0.074	26.2	28	-1.8	15	0.082	29.0	30	-1.0
8	0.042	14.7	17	-2.3					

[2 :]

4.2.2

(t=1)
가 가 가

(1) 가 (t=2)

[3] 3 4
가 가
, [3] 4 4
가 4 3, 4, 5
[3] 4

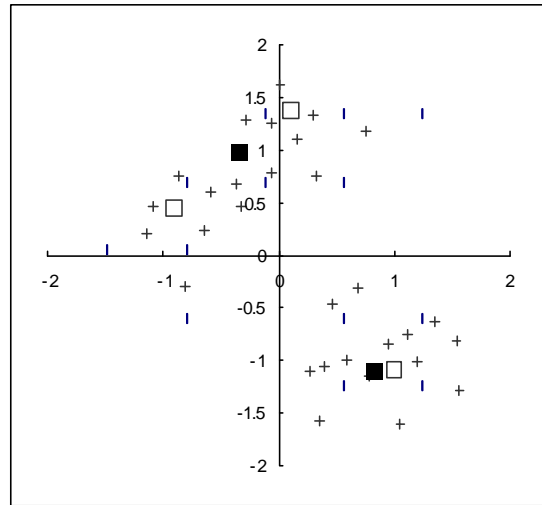
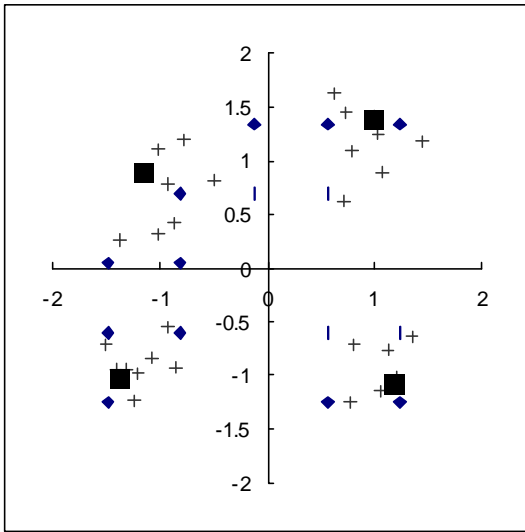
	-LN	PHI	TMC	SAD	CAIC	BIC	AIC
3	277.1	.774	.896	.217	844.6	778.6	686.1
4	178.2	.934	.971	.086	787.7	689.7	552.4
5	177.4	.934	.971	.087	926.9	796.9	614.7

[3 : 가]

, 3 4
가 [4] . 가
4
, 가 , [4]

	.00	.13	.00	.20
	.23	.10	.00	.00
	.03	.03	.20	.07

[4 : 가]



[3 : 가] [4 :]

(2) (t=2)

, 3 ([2]) (T=2)
 [4] 2 , 2 가 가 ,
 [4] 가 .
 가 [5] 가
 2 가 3
 가 BIC PHI, TMC, SAD 2 3 가
 가 [4] '+' 2
 3 가 ,
 가 3 [4] ' '

	-LN	PHI	TMC	SAD	CAIC	BIC	AIC
1	545.2	.120	.510	.626	1099.1	1097.1	1094.3
2	254.5	.741	.874	.191	658.6	624.6	576.9
3	192.3	.887	.946	.083	675.1	609.1	516.7
4	191.8	.887	.946	.088	814.9	716.9	579.6

[5 :]

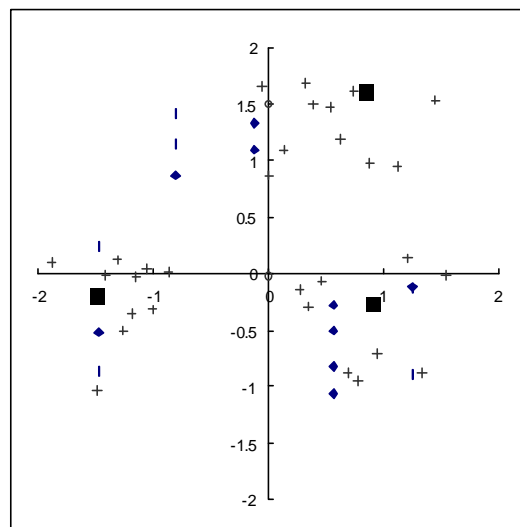
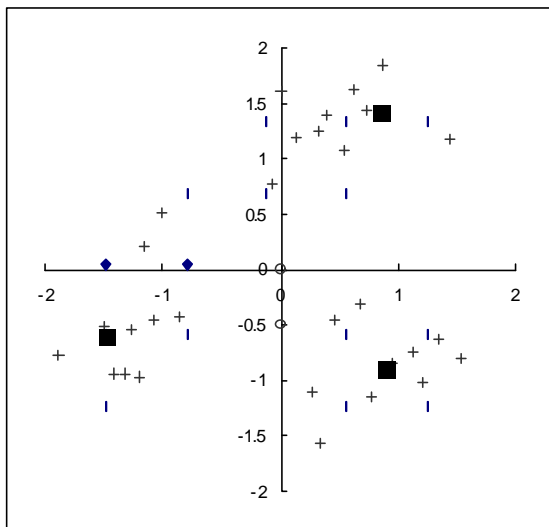
4.2.3

(1) 가 (t=2)

가 2 가 [5-1, 5-2] 가 (t=1) 가
 , [1] 1 ()
 ([5-2]) 가 0
 1 () 가
 ,) 가
 2 가 ('0'), 가
 가 [5-2]
 [6] 3 가 가 가
 . [5-1, 5-2]
 가 .

	-LN	PHI	TMC	SAD	CAIC	BIC	AIC
2	269.4	.694	.875	1.672	829.3	763.3	670.8
3	214.6	.783	.918	.165	732.9	663.9	567.2
4	214.4	.818	.924	.106	745.8	673.8	572.9

[6 : 가]



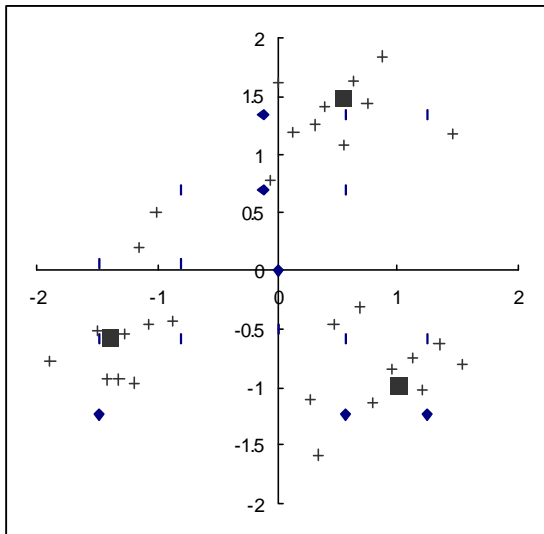
[5-1: 가 -1 vs.2] [5-2: 가 -1 vs.3]

(2) (t=3)

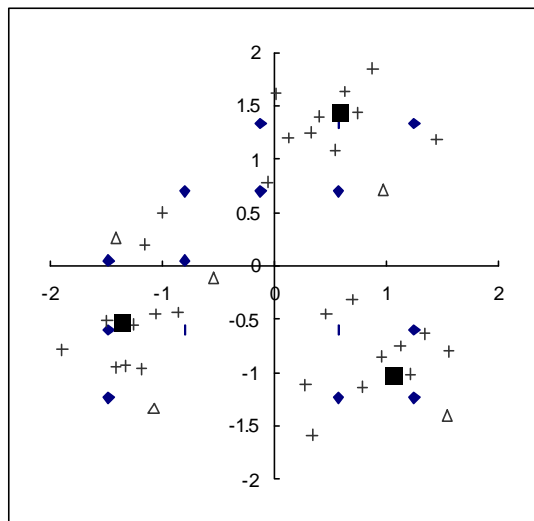
가 , 가 , t=2 t=3
 , 3 2 가 .
 [6] . [7] 가
 가 ,
 3 2 - likelihood
 , 가 3 가
 likelihood 2 .

	-LN	PHI	TMC	SAD	CAIC	BIC	AIC
2	210.5	.874	.944	.085	711.6	645.5	553.1
3	218.2	.897	.956	.175	740.2	671.2	574.5

[7 :]



[6 :]



[7 : 가]

4.2.4 가 (t=2)

가 가

5 가 . [7] 가 () ,

1 4
 internal
 internal 가
 가
 가
 가 ,
 가 가 ,
 가 .
 가 가 option
 local .
 가
 gibbs sampling
 internal

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Appendix

A.1

: likelihood , AIC, CAIC, BIC
 hit-ratios : PHI, TMC, SAD
 : E , S_{ist}
 : M , s_k
 : M standard error
 : , $Y_{sk} + s_k$
 :
 [t-1 x t]
 :
 :

A.2

home page [<http://kmu.kookmin.ac.kr/~jkim>]

down .

(1)

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(, , , ,)

(2) 가

가 ,

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가 ,

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(, , ,)

(, , ,)

(, , , , , , ,)