

## Software Support for Thesaurus Construction and Display

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Thesauri are complex structures that must be displayed in a variety of print and online formats. Computers can be very helpful in developing and maintaining thesauri and creating a large variety of formats. This paper presents a number of desirable advanced functions; many of these are implemented in TermMaster, a thesaurus program under development.

By way of introduction, Figures 1a-d show several output formats (from the Alcohol and Other Drugs Thesaurus) that illustrate formatting capabilities. Note the three levels of detail in the hierarchical lists. In the annotated hierarchical list, note the running heads, the hierarchical context lines on left pages (right pages do not need them), the term numbers with the cross references (+ means that the term has narrower terms), and the use of typography. In the scope note for JD, note the bolded descriptor with preceding number; such embedded descriptors are marked in the input file and the program does the rest. In the alphabetical (KWOC) index, note that the access word **model** assembles all multi-word terms that contain either *model* or *models*.

The bulk of this paper deals with support for thesaurus development. A lot of the knowledge to be included in a new thesaurus is already available in other thesauri and dictionaries. TermMaster can maintain a database that includes multiple thesauri. A thesaurus to be included must first be transformed into one of six input formats. Each thesaurus can then be processed individually, but the real benefits are achieved by combining data from several thesauri or comparing a target thesaurus (the thesaurus currently being worked on) with one or more source thesauri.

J	JU health care administration	JV
<sup>0</sup> J	prevention, intervention, and treatment. health care	
<sup>1</sup> JA	. prevention	
<sup>2</sup> JB	. . prevention goals	
<sup>2</sup> JC	. . prevention model	
<sup>2</sup> JD	. . prevention strategy, program, or service	
<sup>2</sup> JE	. . prevention strategy or program by sponsor or setting	
<sup>2</sup> JF	. . prevention strategy or program by approach	
<sup>2</sup> JG	. . prevention by condition affected	
<sup>1</sup> JI	. intervention	
<sup>2</sup> JJ	. . identification and screening	
<sup>2</sup> JK	. . intervention approach	
<sup>1</sup> JL	. treatment and patient care	
<sup>2</sup> JM	. . patient care	
<sup>2</sup> JN	. . patient assessment and diagnosis	
<sup>2</sup> JP	. . treatment	
<sup>1</sup> JQ	. health care area	
<sup>1</sup> JS	. health care delivery and administration	

Figure 1a. AOD Thesaurus Outline. Excerpt.

<sup>1</sup> JA.	prevention
<sup>2</sup> JA2.	prevention research
<sup>2</sup> JB.	prevention goals
<sup>3</sup> JB2	. prevention of disorder
<sup>4</sup> JB2.2	. . primary prevention
<sup>4</sup> JB2.4	. . secondary prevention
<sup>3</sup> JB4	. prevention of disorder consequences
<sup>3</sup> JB6.	. AOD prevention
<sup>4</sup> JB6.2	. . prevention of problematic AODU
<sup>5</sup> JB6.2.2.	. . . primary prevention of AODU
<sup>5</sup> JB6.2.4.	. . . secondary prevention of AODU
<sup>4</sup> JB6.4.	. . prevention of AODU consequences
<sup>5</sup> JB6.4.2	. . . prevention of AODE
<sup>5</sup> JB6.4.4.	. . . prevention of AODR problems
<sup>2</sup> JC.	prevention model
<sup>3</sup> JC2	. public health model
<sup>3</sup> JC4	. ecological model
<sup>3</sup> JC6	. risk factor model
<sup>3</sup> JC8	. logic model
<sup>2</sup> JD	prevention strategy, program, or service

Figure 1b. AOD Thesaurus Quick Hierarchy. Excerpt.

JB	JA prevention	JB6.4.4
<sup>2</sup> JB.	prevention goals	
	ST <i>prevention outcome</i>	
	BT +JA prevention	
	RT +AD AOD use behavior	
	RT +J2.2.2 health care goal	
	RT +JF prevention strategy or program by approach	
	RT JP4 treatment goals	
	RT MO24.2.8.4 demand reduction policy	
<sup>3</sup> JB2	. prevention of disorder	
	NT +JB6.2 prevention of problematic AODU	
<sup>4</sup> JB2.2	. . primary prevention	
	SN The objective of primary prevention is to reduce prevalence of a disorder by reducing incidence, by preventing the onset of a disorder.	
	NT JB6.2.2 primary prevention of AODU	
<sup>4</sup> JB2.4	. . secondary prevention	
	SN Secondary prevention attempts to reduce the number of active cases of a disease in a population, by affecting the disease's chronicity. Secondary efforts are aimed at individuals who are identified with a disease before the disease has caused suffering or disability.	
	ST <i>early intervention</i>	
	BT +JK intervention approach	
<sup>3</sup> JB4	. prevention of disorder consequences	
	SN This prevention refers to efforts to avoid the sequelae of established disorders. This is usually referred to as treatment, rehabilitation, and relapse prevention.	
	ST <i>tertiary prevention</i>	
	NT +JB6.4 prevention of AODU consequences	
	BT +JP treatment	
	RT +JP16 aftercare	
	RT JP16.4 relapse prevention	
	RT +JP18 rehabilitation	
<sup>3</sup> JB6.	. AOD prevention	
	SN Removing the causes or preventing the development of AOD disorders, accidents, or the harmful effects of drinking or use of other drugs.	
	NT PN4 history of AOD prevention	
<sup>4</sup> JB6.2	. . prevention of problematic AODU	
	NT +HK2.8 cessation of AODU	
	BT +JB2 prevention of disorder	
	RT +AA2.4 problematic AOD use	
<sup>5</sup> JB6.2.2.	. . . primary prevention of AODU	
	SN Primary prevention of AODU is aimed at those who have not started using alcohol or other drugs. Primary prevention focuses on reducing the incidence (rate of occurrence) of AOD use by new users; preventing the development of AOD use problems; and enhancing individual strengths as an inoculant against AOD use.	
	ST <i>prevention of startup of AODU</i>	
	BT +JB2.2 primary prevention	
	RT +AH2.2 AOD use initiation	
<sup>5</sup> JB6.2.4.	. . . secondary prevention of AODU	
	SN Secondary prevention's goal is to reduce the prevalence (total number of cases) of AOD use among those who have already made the choice to begin using alcohol or other drugs, by limiting the duration and the scope of AOD use.	
<sup>4</sup> JB6.4.	. . prevention of AODU consequences	
	BT +JB4 prevention of disorder consequences	
	RT MO24.2.8.12 harm reduction policy	
<sup>5</sup> JB6.4.2	. . . prevention of AODE	
	SN Prevention of the medical or psychological effects of AODU.	
	BT +AM AODE	
<sup>5</sup> JB6.4.4.	. . . prevention of AODR problems	

Figure 1c. AOD Thesaurus Annotated Hierarchy. Sample pages. (Over)

PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

- JC J prevention, intervention, and treatment. health care JD
- <sup>2</sup>JB prevention goals, cont.
- <sup>3</sup>JB6 . AOD prevention, cont.
- <sup>4</sup>JB6.4 . . prevention of AODU consequences, cont.
- <sup>5</sup>JB6.4.4 . . . prevention of AODR problems, cont.
- SN Prevention of AOD related problems such as drinking and driving, or drug trafficking.
- NT +JG4 AODR injury prevention
- RT JK10.8 server intervention
- RT +OR safety and accidents
- <sup>2</sup>JC<sub>e</sub> prevention model
- BT +JA prevention
- <sup>3</sup>JC2 . public health model
- SN This model of prevention focuses attention on three dimensions: the agent, the host, and the environment. The agent is defined as alcohol and other drugs; the host is defined as a person and his or her bio/psycho/social susceptibilities to alcohol and other drug problems as well as the . . .
- BT +JS2 public health
- RT AC6 AOD use susceptibility
- RT +FR attitude and behavior
- RT +LM context
- <sup>3</sup>JC4 . ecological model
- SN The ecological model looks at the behavior of the individual in context; at how it makes sense for that person to be doing what (s)he is doing, given (a) who (s)he is (personality traits, social conditioning, belief system, premises about life, cognitive world view), and (b) how the social context produces stimuli to which (s)he reacts. The social context includes family setting, peer group support system, work setting, cultural environment, and socioeconomic/political conditions.
- ST environmental model
- RT +FD10 personality trait
- RT JF4 ecological prevention approach
- RT +LB culture and personality
- RT +LL outlook on life, lifestyle
- RT +LM context
- RT +MD4.2 cognitive culture
- RT +MN social condition
- RT +TR socioeconomic status
- <sup>3</sup>JC6 . risk factor model
- SN A model that identifies those factors that place individuals and groups "at risk" for alcohol and other drug related harms.
- BT +J2.4.2 risk factors
- RT +J2.6 risk assessment
- <sup>3</sup>JC8 . logic model
- SN A graphic representation of an entire prevention program that shows the logical connections between the conditions that contribute to the need for a prevention program in a community, the activities aimed at addressing these conditions, and the outcomes and impacts expected to result from the activities.
- RT JF2 systems approach to prevention
- <sup>2</sup>JD prevention strategy, program, or service
- SN These are broad terms covering prevention strategies, programs, activities, and practices in general. For example, the term +JD4 prevention program will cover all prevention programs whether they are community based or peer led; the term

Figure 1c. AOD Thesaurus Annotated Hierarchy. Sample pages. Continued

mixed-age

USE GZ4.4.2.16

*other, mixed, or unspecified drug abuse* USE +GC2.6

mixed-age

mixed-age group TA6

mixture

mixture (physics) CF18

MMPI USE HH10.6

MMPI-derived

*MMPI-derived scales* USE HB6.10.22.

mobility

mobility impaired TK4.4.4.6

social mobility MI

mobilization

*stapes mobilization*

USE +HV18 and +HV30 and +XQ2.4.

modality

combined modality therapy HN8.

mode

mode of participation +LZ10

treatment by mode of participation +JM6

model

animal model RJ6.2.2.

biological model RR2.8

causal model RR2.2.

chemical model RR2.6

*common factor model* USE RR2.2.

*diencephalic brain model* USE EV4.6.2

*disease model* USE AJ4.2.

*dynamic simulation model* USE RR4.2

ecological model JC4

economic models MS4.4

*environmental model* USE JC4

experimental brain model EV4.6.2

logic model JC8

mathematical model RR2.4

medical model GA4.4.

model airplane fuel BB4.6.32

model cement BP2.2.8

model prevention strategy or program JD10

models and simulation +RR

*path analysis model* USE +RQ4.4.4. and RR2.2.

prevention model +JC.

public health model JC2

risk factor model JC6

role model FR18.4.2.

scientific model +RR2.

*spinal model* USE EV4.6.2

*structural equation model* USE RR2.4

*theoretical model* USE +RR2.

treatment model +JP6.

twelve step model +JP6.2.

*Use of role models/celebrities in AODR messages*

USE MR6.20.2

modeling

*modeling behavior* USE +FL14.2

moderate

*beneficial moderate alcohol consumption*

USE AD8.8.2 and ED12.4.4.2.

moderate alcohol use AD8.8.2

moderate AOD use +AD8.8.

*moderate drinking* USE AD8.8.2

moderate mental retardation GK32.4

political moderate MO8.4

moderately

*moderately mentally retarded* USE TK2.10

modern

modern and traditional society +MB6

modern history +PQ6

*Modern Iranian language* USE VT4.2

modern society MB6.2

modernization +MS16.8.2.2

modification

behavior modification +FL4.

blood modification +HQ6

modifier

effect modifier RM8

modulation

biological modulation +EA4.12

module

*CIDI Substance Abuse Module* USE +HB6.10. and HH6.

*Mohawk* USE +TH10.4.2.2.

moist

moist climate +PT6.2.2

moist cold climate PT6.2.2.6

moist mild climate PT6.2.2.4

tropical moist climate PT6.2.2.2

*mold -s* USE +WJ.

slime molds WH4

*mole* USE +WR

molecular

atomic and molecular measure CC10

chemical bonding, molecular interaction +CK

*concepts in molecular genetics* USE +EW8.

molecular biology (field) SE2.2

molecular distillation CQ2.22.10

molecular genetics +EW8.

molecular interaction +CK12.

molecular probes +YZ10

*molecular recombination* USE EW8.10.2.

*molecular sieve chromatography* USE CQ2.24.2.26

molecular structure +CK2.

*molecular weight* USE +CB10 and CC10

molecular-beam

molecular-beam spectroscopy CQ6.2.4

molecule CC6.

*Mollusca* USE +WL8.6

mollusk +WL8.6

*molybdenum* USE +ZA2.20.4

mon

*Mon language* USE +VV2.2

Mon-Khmer

Mon-Khmer language +VV2.2

Monaco VJ2.26

monarchy MO4.8

Monday

"Monday syndrome" OR12.2

monday

Figure 1d. AOD Thesaurus Alphabetical Index. Sample page.

PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

Figures 2a-c present three thesaurus samples in a hierarchical input format (a and c) and an alphabetical input format (b).

```
aod   IEB00.20 N km
social sciences, economics, and
law   DE L
. social psychology      DE LA
. . stage of life      DE LJ
. . . birth
. . . infancy
. . . youth (stage of life)
. . . . childhood
. . . . adolescence
. . . . adulthood
. . . . young adulthood
. . . . midlife
. . . . old age
. . . death
personal and group
characteristics DE T
. age DE TA
  RT stage of life
  RT student
. . prenatal
  ST unborn
  RT birth
. . infant
  SN Age 0 - 12 months.
  RT infancy
. . . neonate
  SN Age 0 - 4 weeks.
  ST infant, newborn
. . child
  SN Age 0 - 12 years.
. . adolescent
  SN Girl age 11 - 18, boy age
13 - 19.
  ET pubescent
  BT special populations
  NT high risk youth
  RT youth (stage of life)
  RT adolescence
. . adult
  SN Age 18+
. . . elderly
  SN Age 65+, sometimes 55/60+
  ST aged person
  ET geriatric
  RT old age
  BT special populations
. student      DE TN
. . preschool student
. . elementary student
. . junior high school student
. . high school student
. status by personal life/family
arrangement DE TU
. . status by type of neighborhood
of residence
. . . institutional resident
. . . . nursing home resident
. high risk group and special
population DE TZ
. . high risk group
. . . high risk youth
. . special populations
```

Figure 2a. Input file for thesaurus AOD.

```
s1 ANN-1.00 P
Infant, newborn DE
  ST Newborn
Junior high school student DE
  ST Junior high student
Pregnant teen DE
  BT Teenager
Retired DE
Senior citizen DE
  SN The term "senior citizen" is sometimes used for an age group
  starting with 55 or 60, and could be considered a broader term
  including elderly. For purposes of this thesaurus, it was decided
  not to make this fine distinction.
  ST Elderly
  RT Retired
  RT Senior citizen's home
Senior citizen's home DE
  ST Retirement home
Teenage mother DE
  BT Teenager
Teenager DE
  ET Pubescent
  NT Pregnant teen
  NT Teenage mother
```

Figure 2b. Input file for thesaurus s1.

The heart of a good thesaurus is a well-structured hierarchy; therefore, the program provides extensive support for processing hierarchies. It can read a hierarchy presented in the usual format — linear arrangement with indentions — and preserve the meaningful sequence by assigning notations, or storing user-assigned notations, or a mixture of the two. In Figure 2a, the lexicographer has assigned one- or two-letter notations to broad terms; the program takes over from there. TermMaster creates explicit records for the hierarchical relationships implied by the arrangement.

A thesaurus term is linked to other terms through a variety of relationships. TermMaster allows a large number of such relationships, making it possible, for example to distinguish in the database (not necessarily in the user version) between ST (Synonymous Term), and ET (Equivalent Term, quasi-synonym) (see, for example, under *elderly*); one might even use, in addition, SP (SPelling variant) and AB (ABbreviation). Scope notes are treated as relationships to text; thus a term can have multiple scope notes and there can be different kinds of scope notes, such as History Notes or Internal Notes (See again under *elderly*).

Some relationships are more important than others; TermMaster allows for (but does not require) specifications of three levels of relationship importance which can be used to govern the inclusion

```
s2 IEB00-50 F DS
Persons by Age DE B
. Teenagers
  ST Youth (Young Person)
  RT Junior High Students
  RT High School Students
. . Runaway Youths
. Adults
. . Aged Persons
  SN Age 65 and over
  ST Older Adults
  ST Geriatric
  RT Retirement Homes
  RT Nursing Home Residents
Students DE E
. Junior High Students
. High School Students
Persons by Type of Residence DE F
. Nursing Home Residents
Types of Dwellings DE M
. Retirement Homes
```

Figure 2c. Input file for thesaurus s2.

of relationships in various printouts (not illustrated). The program can easily be customized to include a user-defined set of relationships.

At input, TermMaster reduces terms to singular (unless overridden), so a term can be recognized as the same even if one thesaurus uses singular and the other plural. The program does keep the information on the term form for each thesaurus in the database.

TermMaster can display the contents of the thesaurus database in many ways. Files for printing are output as WordPerfect 5.1 documents. The user has considerable control over the content of each output and over features such as type font and size or number of columns; such features are specified in a print command file.

**The chief output formats for publication are:**

**Hierarchical list.** Figure 3a shows a print command file for a typical annotated hierarchical list of thesaurus AOD, Figure 4a shows the result. A hierarchical list can be indented as shown (printout type HI) or aligned at the left margin (HL.). Levels are always indicated by a superscript to the notation. The user can control many features, for example: the number of levels to be included, the appearance (large, bold) for each level, the appearance of synonyms (italic or regular), the first hierarchical level to be shown by indentation, and the information to be included for each term; relationship types can be grouped (e.g., SP, AB, ST, ET together), with the external label specified at printout time (e.g., all four could be mapped to ST). Relationships can be selected by importance level. For properly marked terms included in a scope note, the program inserts the notation and replaces the term by the corresponding preferred term. Figure 3b shows a sample print command file for thesaurus s2 with different parameters for the levels; Figure 4b shows the result. The print command file for a quick hierarchical list (see Figure 1b) would simply omit the relationship specifications. An outline (Figure 1a) is a special quick hierarchical list that includes all descriptors whose notation consists entirely of letters and indention starting with level 1.

**Alphabetical list** (under development). Same user control over information included.

**Alphabetical KWOC index.** A multiword term appears under the singular access word even if the word appears in the term in the plural. A sample print command file is shown in Figure 3c, the result in Figure 4c.

**Subsets.** Different uses of the same overall thesaurus often require different subsets to be printed out separately. A subset is different from a separate thesaurus in that all subsets use the same basic hierarchical structure and notations stay the same across subsets. A subset may also be established to include specially important descriptors that should be marked with a special symbol. TermMaster supports the definition and use of up to 80 subsets. In Figures 1a-d, the subscript e following the notation indicates that the descriptor belongs to the subset of descriptors used to index the Alcohol Science Database (ETOH).

```
1 aod DS
2
3 zzz
4 HI 1 TR 11.0 A
5 .4 .6 1.05 1.05 .5 .225 1.59
6 =DIB A 10/29 13/0/1/13/2/0/1/0/-1 11200
7
8 $
9 SN, FN SN
10 AB, FT, ST, ET ST
11 NT, NA, NC, NF NT
12 BT, BC, BF BT
13 RC, RT, RE RT
14 ~
```

Figure 3a. Print command file for AOD annotated hierarchy.

```
1 aod DS
6 =DIB A 10/29 13/0/1/13/1/0/1/0/-1 11200
```

Figure 3b. Print command file for s2 annotated hierarchy (only lines different from 2a).

```
1 aod DS
2
3 zzz
4 AI 2 TR 9.0 A
5 .4 .6 .80 .80 .5 .2 1.59
6 @DII A 10/29 13/1/2/13/2/0/1/0/0 11200
7
8 $
9 ~
```

Figure 3c. Print command file for AOD alphabetical index.

---

L	LA social psychology	LJ10
<sup>0</sup> L	social sciences, economics, and law	
<sup>1</sup> LA	social psychology	
	NT +LJ stage of life	
<sup>2</sup> LJ	. stage of life	
	BT +LA social psychology	
	RT +TA age	
<sup>3</sup> LJ2	. . birth	
	RT TA2 prenatal	
<sup>3</sup> LJ4	. . infancy	
	RT +TA4 infant	
<sup>3</sup> LJ6	. . youth (stage of life)	
	RT +TA8 adolescent	
<sup>4</sup> LJ6.2	. . . childhood	
<sup>4</sup> LJ6.4	. . . adolescence	
	RT +TA8 adolescent	
<sup>3</sup> LJ8	. . adulthood	
<sup>4</sup> LJ8.2	. . . young adulthood	
<sup>4</sup> LJ8.4	. . . midlife	
<sup>4</sup> LJ8.6	. . . old age	
	RT TA10.2 elderly	
<sup>3</sup> LJ10	. . death	

T	T personal and group characteristics	TZ4
<sup>0</sup> T	personal and group characteristics	
<sup>1</sup> TA	age	
	RT +LJ stage of life	
	RT +TN student	
<sup>2</sup> TA2	. prenatal	
	ST <i>unborn</i>	
	RT LJ2 birth	
<sup>2</sup> TA4	. infant	
	SN Age 0 - 12 months.	
	RT LJ4 infancy	
<sup>3</sup> TA4.2	. . neonate	
	SN Age 0 - 4 weeks.	
	ST <i>infant, newborn</i>	
<sup>2</sup> TA6	. child	
	SN Age 0 - 12 years.	
<sup>2</sup> TA8	. adolescent	
	SN Girl age 11 - 18, boy age 13 - 19.	
	ST <i>pubescent</i>	
	NT TZ2.2 high risk youth	
	BT +TZ4 special populations	
	RT +LJ6 youth (stage of life)	
	RT LJ6.4 adolescence	
<sup>2</sup> TA10	. adult	
	SN Age 18+	
<sup>3</sup> TA10.2	. . elderly	
	SN Age 65+, sometimes 55/60+	
	ST <i>aged person</i>	
	ST <i>geriatric</i>	
	BT +TZ4 special populations	
	RT LJ8.6 old age	
<sup>1</sup> TN	student	
	RT +TA age	
<sup>2</sup> TN2	. preschool student	
<sup>2</sup> TN4	. elementary student	
<sup>2</sup> TN6	. junior high school student	
<sup>2</sup> TN8	. high school student	
<sup>1</sup> TU	status by personal life/family arrangement	
<sup>2</sup> TU2	. status by type of neighborhood of residence	
<sup>3</sup> TU2.2	. . institutional resident	
<sup>4</sup> TU2.2.2	. . . nursing home resident	
<sup>1</sup> TZ	high risk group and special population	
<sup>2</sup> TZ2	. high risk group	
<sup>3</sup> TZ2.2	. . high risk youth	
	BT +TA8 adolescent	
<sup>2</sup> TZ4	. special populations	
	NT +TA8 adolescent	
	NT TA10.2 elderly	

Figure 4a. AOD annotated hierarchy.

PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

- B M types of dwellings
- <sup>0</sup>B persons by age
  - <sup>1</sup>B5 . teenagers
    - ST youth (*young person*)
    - RT E5 junior high students
    - RT E10 high school students
  - <sup>2</sup>B5-5 . . runaway youths
  - <sup>1</sup>B10 . adults
  - <sup>2</sup>B10-5 . . aged persons
    - SN Age 65 and over
    - ST geriatric
    - ST older adults
    - RT F5 nursing home residents
    - RT M5 retirement homes
- <sup>0</sup>E students
  - <sup>1</sup>E5 . junior high students
    - RT +B5 teenagers
  - <sup>1</sup>E10 . high school students
    - RT +B5 teenagers
- <sup>0</sup>F persons by type of residence
  - <sup>1</sup>F5 . nursing home residents
    - RT B10-5 aged persons
- <sup>0</sup>M types of dwellings
  - <sup>1</sup>M5 . retirement homes
    - RT B10-5 aged persons

Figure 4b. S2 annotated hierarchy.

**adolescence**

**youth**

adolescence LJ6.4  
 adolescent +TA8  
 adult +TA10  
 adulthood +LJ8  
     young adulthood LJ8.2  
 age +TA  
     old age LJ8.6  
 aged  
     aged person USE TA10.2  
 arrangement  
     status by personal life/family arrangement +TU  
 birth LJ2  
 characteristics  
     personal and group characteristics +T  
 child TA6  
 childhood LJ6.2  
 death LJ10  
 economics  
     social sciences, economics, and law +L  
 elderly TA10.2  
 elementary  
     elementary student TN4  
 family  
     status by personal life/family arrangement +TU  
 geriatric USE TA10.2  
 group  
     high risk group +TZ2  
     high risk group and special population +TZ  
     personal and group characteristics +T  
 high  
     high risk group +TZ2  
     high risk group and special population +TZ  
     high risk youth TZ2.2  
     high school student TN8  
     junior high school student TN6  
 home  
     nursing home resident TU2.2.2  
 infancy LJ4  
 infant +TA4  
     infant, newborn USE TA4.2  
 institutional  
     institutional resident +TU2.2  
 junior  
     junior high school student TN6  
 law  
     social sciences, economics, and law +L  
 life  
     stage of life +LJ  
     status by personal life/family arrangement +TU  
     youth (stage of life) +LJ6  
 midlife LJ8.4  
 neighborhood  
     status by type of neighborhood of residence +TU2  
 neonate TA4.2  
 newborn  
     infant, newborn USE TA4.2

nursing  
     nursing home resident TU2.2.2  
 old  
     old age LJ8.6  
 person  
     aged person USE TA10.2  
 personal  
     personal and group characteristics +T  
     status by personal life/family arrangement +TU  
 population  
     high risk group and special population +TZ  
     special populations +TZ4  
 prenatal TA2  
 preschool  
     preschool student TN2  
 psychology  
     social psychology +LA  
 pubescent USE +TA8  
 residence  
     status by type of neighborhood of residence +TU2  
 resident  
     institutional resident +TU2.2  
     nursing home resident TU2.2.2  
 risk  
     high risk group +TZ2  
     high risk group and special population +TZ  
     high risk youth TZ2.2  
 school  
     high school student TN8  
     junior high school student TN6  
 science  
     social sciences, economics, and law +L  
 social  
     social psychology +LA  
     social sciences, economics, and law +L  
 special  
     high risk group and special population +TZ  
     special populations +TZ4  
 stage  
     stage of life +LJ  
     youth (stage of life) +LJ6  
 status  
     status by personal life/family arrangement +TU  
     status by type of neighborhood of residence +TU2  
 student +TN  
     elementary student TN4  
     high school student TN8  
     junior high school student TN6  
     preschool student TN2  
 type  
     status by type of neighborhood of residence +TU2  
 unborn USE TA2  
 young  
     young adulthood LJ8.2  
 youth  
     high risk youth TZ2.2  
     youth (stage of life) +LJ6

Figure 4c. AOD alphabetical index.

## PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

There are three **output file types that assist in thesaurus development.**

**Edit print with sources.** At present, interaction with TermMaster is batch-oriented. The program can produce a plain ASCII file which can be edited with any word processor and re-input; for many changes, this process is actually more convenient than online editing. To assist the lexicographer, the program also produces a nicely formatted annotated hierarchical list, called the reference print. The print command file is shown in Figure 5a; AOD is the target thesaurus to be worked on, s1 and s2 are two sources that are to be consulted for more information. The two resulting files are shown in Figures 6a1 and 6a2. Starting from a target term, the program collects all its synonyms using relationships of the ST-group (ST, ET, SP, AB) from any of the specified sources (in the example s1 and s2). For example, starting from *adolescent* it finds *pubescent* (ET relationship in AOD), which leads to *teenager* (ET relationship in s1) which leads to *youth (young person)* (ST relationship in s2). The program then assembles — under the original target term - *adolescent* all non-ST relationships from all the sources starting from any of the synonyms. It replaces the term referred to by the term preferred in the target (if available). Thus the program brings together all relationships that are conceptually the same but expressed in different terms as long as these terms are shown as synonymous in the sources used.

An edit or reference print gives relationships with their specific symbols (no mapping) in an order determined at the time the program is compiled. The reference print gives for all main terms and synonyms the sources in which they occur. Relationships new to the target are flagged with (+); if the cross-referenced term does not occur in the target, it has no notation. In the future, the program will list all the sources for a relationship.

TermMaster provides further support for the development of the relationship network: Individual words in a multi-word term are isolated as tentative semantic factors, and thus broader terms, subject, of course, to editing. At the users option, these relationships can be shown in an edit print. A more sophisticated algorithm assigning tentative semantic factors through inheritance from broader terms is under development.

**Comparison print.** The purpose of a comparison print is to identify terms that occur in any of a number of sources but are missing from the target thesaurus being worked on — a check on completeness. More generally, the purpose is to see how the terms from the source thesauri are treated in the target thesaurus. The print command file is shown in Figure 5b, the resulting files in Figures 6b1 and 6b2. The long version (Figure 6b2) lists all terms from the target thesaurus that have at least one word in common with the missing term; this facilitates identifying a synonym in the target thesaurus or, if none is found, finding a good place for the missing term in the target thesaurus. For example, AOD does not contain the s2 term *persons by type of residence*, but under the component word *residence* the lexicographer sees the corresponding AOD term *status by type of neighborhood of residence*. Figure 6b3 gives a page from a real comparison print; it makes it easy to find the AOD term corresponding to the ESTES term *alcohol treatment facility*.

**Assembled hierarchy** (no example shown). A rough draft hierarchy pieced together from binary hierarchical relationships from specified source thesauri.

In the example, the lexicographer edited file 6a2 with the aid of the reference hierarchy 6a1 and the comparison print 6b1 and 6b2. The resulting hierarchy with additional terms and relationships is shown in Figure 7. For example, *adolescent* was changed to *teenager*, following the lead of the two sources. *Teenage mother* was added. A better scope note for *elderly* was found in a source.

PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP

```
1 aod DS
2
3 zzz
4 ED 1 TR 11.0 A
5 .4 .6 1.05 1.05 .5 .225 1.59
6 =DIB A 10/29 13/0/1/13/2/0/1/0/-1 11200
7
8 $
9 ~
```

Figure 5a. Print command file for AOD edit print with sources.

```
1 aod DS
2
3 zzz
4 CP 1 TR 11.0 A
5 .4 .6 1.05 1.05 .5 .225 1.59
6 =DIB A 10/29 13/0/1/13/1/0/1/0/-1 11200
7
8 s2 s1
9 $
10 ~
```

Figure 5b. Print command file for AOD comparison print.

---

```
L LA social psychology LJ10
^L social sciences, economics, and law (aod: DE)
^1LA . social psychology (aod: DE)
      NT +LJ stage of life
^2LJ . . stage of life (aod: DE)
      BT +LA social psychology
      RT +TA age
^3LJ2 . . . birth (aod: DE)
      RT TA2 prenatal
^3LJ4 . . . infancy (aod: DE)
      RT +TA4 infant
^3LJ6 . . . youth (stage of life) (aod: DE)
      RT +TA8 adolescent
^4LJ6.2 . . . . childhood (aod: DE, aod: SW)
^4LJ6.4 . . . . adolescence (aod: DE)
      RT +TA8 adolescent
^3LJ8 . . . adulthood (aod: DE, aod: SW)
^4LJ8.2 . . . . young adulthood (aod: DE)
^4LJ8.4 . . . . midlife (aod: DE)
^4LJ8.6 . . . . old age (aod: DE)
      RT TA10.2 elderly
^3LJ10 . . . death (aod: DE)
```

T	T personal and group characteristics	TN6
<sup>0</sup> T	personal and group characteristics (aod: DE)	
<sup>1</sup> TA	. age (aod: DE, aod: SW, s2: SW) RT +LJ stage of life RT +TN student	
<sup>2</sup> TA2	. . prenatal (aod: DE) ST <i>unborn</i> (aod: NP) RT LJ2 birth	
<sup>2</sup> TA4	. . infant (aod: DE, aod: SW, s1: SW) SN Age 0 - 12 months.	
<sup>3</sup> TA4.2	. . . neonate (aod: DE) SN Age 0 - 4 weeks. ST <i>infant, newborn</i> (aod: NP, s1: DE) ST <i>newborn</i> (aod: SW, s1: NP, s1: SW)	
<sup>2</sup> TA6	. . child (aod: DE) SN Age 0 - 12 years.	
<sup>2</sup> TA8	. . adolescent (aod: DE) SN Girl age 11 - 18, boy age 13 - 19. ST <i>teenager</i> (s1: DE, s2: DE, s2: SW) ST <i>youth (young person)</i> (s2: NP) ET <i>pubescent</i> (aod: NP, s1: NP, s1: SW) ET <i>teenager</i> (s1: DE, s2: DE, s2: SW) NT TZ2.2 high risk youth NT pregnant teen (+) NT runaway youths (+) NT teenage mother (+) BT +TZ4 special populations BT persons by age (+) RT +LJ6 youth (stage of life) RT LJ6.4 adolescence RT TN6 junior high school student (+) RT TN8 high school student (+)	
<sup>2</sup> TA10	. . adult (aod: DE, s2: DE, s2: SW) SN Age 18+ BT persons by age (+)	
<sup>3</sup> TA10.2	. . . elderly (aod: DE, s1: NP, s1: SW) IN Clarify definition SN Age 65+, sometimes 55/60+ ST <i>aged person</i> (aod: NP, s2: DE) SN Age 65 and over ST <i>geriatric</i> (aod: NP, s2: NP, s2: SW) ST <i>older adults</i> (s2: NP) ST <i>senior citizen</i> (s1: DE) SN The term "senior citizen" is sometimes used for an age group starting with 55 or 60, and could be considered a broader term including elderly. For purposes of this thesaurus, it was decided not to make this fine distinction. ET <i>geriatric</i> (aod: NP, s2: NP, s2: SW) RT retired (+) RT retirement homes (+)	
<sup>1</sup> TN	. student (aod: DE, aod: SW, s1: SW, s2: DE, s2: SW) RT +TA age	
<sup>2</sup> TN2	. . preschool student (aod: DE)	
<sup>2</sup> TN4	. . elementary student (aod: DE)	
<sup>2</sup> TN6	. . junior high school student (aod: DE, s1: DE)	

Figure 6a1. AOD edit print. Reference print for lexicographer. (Over)

TN8	TZ high risk group and special population	TZ4
	ST <i>junior high student</i> (s1: NP, s2: DE)	
	RT +TA8 adolescent (+)	
<sup>2</sup> TN8	. . high school student (aod: DE, s2: DE)	
	RT +TA8 adolescent (+)	
<sup>1</sup> TU	. status by personal life/family arrangement (aod: DE)	
<sup>2</sup> TU2	. . status by type of neighborhood of residence (aod: DE)	
<sup>3</sup> TU2.2	. . . institutional resident (aod: DE)	
<sup>4</sup> TU2.2.2	. . . . nursing home resident (aod: DE, s2: DE)	
	BT persons by type of residence (+)	
	RT TA10.2 elderly (+)	
<sup>1</sup> TZ	. high risk group and special population (aod: DE)	
<sup>2</sup> TZ2	. . high risk group (aod: DE)	
<sup>3</sup> TZ2.2	. . . high risk youth (aod: DE)	
	BT +TA8 adolescent	
<sup>2</sup> TZ4	. . special populations (aod: DE)	
	NT +TA8 adolescent	
	NT TA10.2 elderly	

Figure 6a1. AOD edit print. Reference print for lexicographer. Continued

<p>aod IEB00.20 N DS                  social sciences, economics, and                  law DE L                  . social psychology DE LA                    NT stage of life                  . . stage of life DE LJ                    BT social psychology                    RT age                  . . . birth                    RT prenatal                  . . . infancy                    RT infant                  . . . youth (stage of life)                    RT adolescent                  . . . . childhood                  . . . . adolescence                    RT adolescent                  . . . . adulthood                  . . . . young adulthood                  . . . . midlife                  . . . . old age                    RT elderly                  . . . death                  personal and group characteristics                  DE T                  . age DE TA                    RT stage of life                    RT student                  . . prenatal                    ST unborn                    RT birth                  . . infant                    SN Age 0 - 12 months.                  . . . neonate                    SN Age 0 - 4 weeks.                    ST infant, newborn                    ST newborn                  . . child                    SN Age 0 - 12 years.                  . . adolescent                    SN Girl age 11 - 18, boy age 13                  - 19.                    ST teenager                    ST youth (young person)                    ET pubescent                    ET teenager                    NT high risk youth                    NT pregnant teen                    NT runaway youths                    NT teenage mother                    BT special populations                    BT persons by age</p>	<p>RT youth (stage of life)                  RT adolescence                  RT junior high school student                  RT high school student                  . . adult                    SN Age 18+                    BT persons by age                  . . . elderly                    IN Clarify definition                    SN Age 65+, sometimes 55/60+                    ST aged person                    SN Age 65 and over                    ST geriatric                    ST older adults                    ST senior citizen                    SN The term "senior citizen"                  is sometimes used for an age group                  starting with 55 or 60, and could                  be considered a broader term                  including elderly. For purposes                  of this thesaurus, it was decided                  not to make this fine distinction.                    ET geriatric                    RT retired                    RT retirement homes                  . student DE TN                    RT age                  . . preschool student                  . . elementary student                  . . junior high school student                    ST junior high student                    RT adolescent                  . . high school student                    RT adolescent                  . status by personal life/family                  arrangement DE TU                  . . status by type of neighborhood                  of residence                  . . . institutional resident                  . . . . nursing home resident                    BT persons by type of                  residence                    RT elderly                  . high risk group and special                  population DE TZ                  . . high risk group                  . . . high risk youth                    BT adolescent                  . . special populations                    NT adolescent                    NT elderly</p>
---	---

Figure 6a2. AOD edit print. File for editing and re-input.

adults B10 (aod: DE, s2: DE, s2: SW)	^#teen (s1: SW)
adult +TA10	
*aged persons B10-5 (aod: NP, s2: DE)	*pubescent (aod: NP, s1: NP, s1: SW)
aged person	adolescent +TA8 (aod: DE)
elderly TA10.2 (aod: DE, s1: NP, s1: SW)	#retired (s1: DE)
*infant, newborn (aod: NP, s1: DE)	#retirement homes M5 (s1: NP, s2: DE)
neonate TA4.2 (aod: DE)	^#home (aod: SW, s1: SW, s2: SW)
*junior high school student (aod: DE, s1: DE)	^#retirement (s1: SW, s2: SW)
TN6	#runaway youths B5-5 (s2: DE)
#junior high students E5 (s1: NP, s2: DE)	^#youth (aod: SW, s2: SW)
junior high school student TN6 (aod: DE, s1: DE)	^#runaway (s2: SW)
#newborn (aod: SW, s1: NP, s1: SW)	#senior citizen (s1: DE)
neonate TA4.2 (aod: DE)	elderly TA10.2 (aod: DE, s1: NP, s1: SW)
nursing home residents F5 (aod: DE, s2: DE)	...
nursing home resident TU2.2.2	students +E (aod: DE, aod: SW, s1: SW, s2: DE, s2: SW)
#older adults B10-5 (s2: NP)	student +TN
elderly TA10.2 (aod: DE, s1: NP, s1: SW)	#teenage mother (s1: DE)
#persons by age +B (s2: DE)	^#teenage (s1: SW)
^*age (aod: DE, aod: SW, s2: SW)	^#mother (s1: SW)
+TA	#teenagers +B5 (s1: DE, s2: DE, s2: SW)
^#persons (aod: SW, s2: SW)	adolescent +TA8 (aod: DE)
#persons by type of residence +F (s2: DE)	#types of dwellings M (s2: DE)
^#persons (aod: SW, s2: SW)	^#type (aod: SW, s2: SW)
^#type (aod: SW, s2: SW)	^#dwellings (s2: SW)
^#residence (aod: SW, s2: SW)	#youth (young person) +B5 (s2: NP)
#pregnant teen (s1: DE)	adolescent +TA8 (aod: DE)
^#pregnant (s1: SW)	

- # Not in target thesaurus
- \* In target thesaurus, but with different term type
- ^ Extracted single word

Figure 6b1. AOD comparison print. Short version.

adults B10 (aod: DE, s2: DE, s2: SW)  
adult +TA10

\*aged persons B10-5 (aod: NP, s2: DE)  
aged person  
elderly TA10.2 (aod: DE, s1: NP, s1: SW)

...

\*infant, newborn (aod: NP, s1: DE)  
neonate TA4.2 (aod: DE)

\*junior high school student (aod: DE, s1: DE)  
TN6

#junior high students E5 (s1: NP, s2: DE)  
junior high school student TN6 (aod: DE, s1: DE)

#newborn (aod: SW, s1: NP, s1: SW)  
neonate TA4.2 (aod: DE)

nursing home residents F5 (aod: DE, s2: DE)  
nursing home resident TU2.2.2

#older adults B10-5 (s2: NP)  
elderly TA10.2 (aod: DE, s1: NP, s1: SW)

#persons by age +B (s2: DE)

^\*age (aod: DE, aod: SW, s2: SW)  
+TA  
///Stopword; no containing terms printed.

^#persons (aod: SW, s2: SW)  
aged person TA10.2 (aod: NP, s2: DE)

#persons by type of residence +F (s2: DE)

^#persons (aod: SW, s2: SW)  
aged person TA10.2 (aod: NP, s2: DE)

^#type (aod: SW, s2: SW)  
///Stopword; no containing terms printed.

^#residence (aod: SW, s2: SW)  
status by type of neighborhood of  
residence +TU2 (aod: DE)

#pregnant teen (s1: DE)

^#pregnant (s1: SW)

^#teen (s1: SW)

\*pubescent (aod: NP, s1: NP, s1: SW)  
adolescent +TA8 (aod: DE)

#retired (s1: DE)

#retirement homes M5 (s1: NP, s2: DE)

^#home (aod: SW, s1: SW, s2: SW)  
nursing home resident TU2.2.2 (aod: DE, s2: DE)

^#retirement (s1: SW, s2: SW)

#runaway youths B5-5 (s2: DE)

^#youth (aod: SW, s2: SW)  
youth (stage of life) +LJ6 (aod: DE)  
high risk youth TZ2.2 (aod: DE)

^#runaway (s2: SW)

#senior citizen (s1: DE)  
elderly TA10.2 (aod: DE, s1: NP, s1: SW)

...

students +E (aod: DE, aod: SW, s1: SW, s2: DE, s2: SW)  
student +TN

#teenage mother (s1: DE)

^#teenage (s1: SW)

^#mother (s1: SW)

#types of dwellings M (s2: DE)

^#type (aod: SW, s2: SW)  
///Stopword; no containing terms printed.

^#dwellings (s2: SW)

#youth (young person) +B5 (s2: NP)  
adolescent +TA8 (aod: DE)

Figure 6b2. AOD comparison print. Long version.

**#access** (aod: SW, scope: DE, grant: SW, psych1: SW, eric: SW, socab: DE, osapde: DE)  
access to AOD in the context +LQ10 (aod: DE)

**#adapter** (estes: DE)

**#addict** (aod: SW, jama: DE, socab: NP, jsa: SW, saia: NP, caaal: SW, nida: DE, alko: SW, aadao: SW, niaaa: DE, conc: SW, osapde: DE, osapde: SW)  
drug addiction (socab: DE)  
*drug addict* TM2.6 (aod: NP, jama: NP, jsa: DE, alko: DE, aadao: DE, niaaa: DE, conc: DE, osapde: DE)  
*recovered addict* TM6.2.6 (aod: NP, osapde: DE)  
*AOD addict* TM2.6 (aod: NP)

**#agency** (aod: SW, etoi: SW, etoc: SW, scope: DE, psych1: SW, eric: DE, eric: SW, socab: NP, socab: SW, jsa: SW, saia: SW, caaal: SW, cork: SW)(siec: SW, niaaa: SW, conc: DE, the: DE, marin: NP, marin: SW, osapde: SW)  
associations (socab: DE)  
*federal agencies* MG10.6 (aod: NP, the: DE, marin: NP, osapde: DE)  
independent agencies MG10.6 (aod: DE)  
law enforcement agencies MP4.2 (aod: DE)  
prosecution agencies MP4.4 (aod: DE)  
defense agencies MP4.6 (aod: DE)  
*legal aid agencies* MP6.10 (aod: NP)

**#alcohol treatment facility** (estes: DE)

**^\*alcohol** (aod: DE, aod: SW, etohrq: SW, etoi: SW, etoc: SW, scope: SW, grant: SW, estes: SW, jama: SW, psych1: DE, psych1: SW, eric: SW)(socab: DT, jsa: DE, jsa: SW, saia: DE, who: SW, caaal: DE, caaal: SW, nida: DE, nida: SW, ncadi: SW, cork: SW, alko: DE, alko: SW, abmrf: DE, abmrf: SW)(aadao: DE, aadao: SW, galan: SW, siec: DE, d&h: DE, guide: SW, cas: SW, cassn: SW, adaw: SW, arf: SW, argos: SW, pac: DE, pac: SW, varc: DE, niaaa: SW)(jom: SW, dict: DE, dict: SW, addc: DE, addc: SW, nz: SW, conc: DE, prc: SW, haz: DE, dio-ap: SW, avg: SW, socio: SW, marin: SW, osapde: DE, osapde: SW)(etid: SW) +ZD4.2

**^\*facility** (aod: DE, aod: SW, etoi: SW, etoc: SW, scope: DE, estes: SW, psych1: SW, eric: DE, eric: SW, socab: DE, socab: SW, jsa: SW, saia: SW)(caaal: SW, ncadi: SW, abmrf: SW, cas: SW, cassn: SW, arf: SW, nz: SW, haz: SW, marin: SW, osapde: DE, osapde: SW) QF18.2  
intermediate care facility KG10.10.12 (aod: DE, jsa: NP)  
maximum security facility MP4.10.2.2 (aod: DE)(psych1: DE)  
residential treatment facility +KG10.10.16 (aod: DE, socab: NP)  
residential institutions (socab: DE)  
transportation facilities and systems + (aod: DE)  
correctional facility worker +SJ2.20.12 (aod: DE)  
type of facility +MM8 (aod: DE)  
correctional system and facilities +MP4.10 (aod: DE)  
correctional facilities by level of security +MP4.10.2 (aod: DE)  
medium security facility MP4.10.2.4 (aod: DE)  
minimum security facility MP4.10.2.6 (aod: DE)  
types of correctional facilities +MP4.10.4 (aod: DE)  
juvenile correctional facilities +MP4.10.4.6 (aod: DE)  
community correctional facilities +MP4.10.4.8 (aod: DE)  
*child care facilities* +MM4.4.2 (aod: NP)  
AOD treatment facility +A20.16 (aod: DE)  
health care facilities +KG10.10 (aod: DE)  
hospice facility KG10.10.6 (aod: DE)  
mental health facility KG10.10.8 (aod: DE)  
skilled nursing facility KG10.10.10 (aod: DE)  
ambulatory care facility +KG10.10.14 (aod: DE)  
outpatient facility KG10.10.14.2 (aod: DE)

**^\*treatment** (aod: DE, aod: SW, etohrq: SW, etoi: DE, etoi: SW, etoc: DE, etoc: SW, scope: SW, grant: DE, grant: SW, estes: SW, jama: DE, psych1: DE)(psych1: SW, eric: SW, socab: DE, socab: SW, jsa: SW, saia: DE, saia: SW, caaal: DE, caaal: SW, nida: SW, ncadi: SW, cork: NP, cork: SW, alko: DE, alko: SW)(abmrf: SW, aadao: DE, aadao: SW, galan: SW, siec: NP, d&h: DE, d&h: SW, guide: SW, cas: DE, cas: SW, cassn: SW, arf: SW, argos: SW, pac: DE, varc: DE)(varc: SW, niaaa: SW, dict: DE, dict: SW, addc: DE, addc: SW, nz: DE, nz: SW, conc: DE, conc: SW, prc: DE, haz: DE, dio-ap: SW, avg: DE, avg: SW, socio: DE)(gh: SW, marin: DE, marin: SW, osapde: DE, osapde: SW, etid: DE, etid: SW) +KD

Figure 6b3. AOD comparison print. Long version. "Real" example.

L	LA social psycholog	LJ10
<sup>0</sup> L	social sciences, economics, and law	
<sup>1</sup> LA	social psychology	
	NT +LJ stage of life	
<sup>2</sup> LJ	. stage of life	
	BT +LA social psychology	
	RT +TA age	
<sup>3</sup> LJ2	. . birth	
	RT TA2 prenatal	
<sup>3</sup> LJ4	. . infancy	
	RT +TA4 infant	
<sup>3</sup> LJ6	. . youth (stage of life)	
	RT +TA8 teenager	
<sup>4</sup> LJ6.2	. . . childhood	
<sup>4</sup> LJ6.4	. . . adolescence	
	RT +TA8 teenager	
<sup>3</sup> LJ8	. . adulthood	
<sup>4</sup> LJ8.2	. . . young adulthood	
<sup>4</sup> LJ8.4	. . . midlife	
<sup>4</sup> LJ8.6	. . . old age	
	RT TA10.2 elderly	
<sup>3</sup> LJ10	. . death	
<sup>0</sup> T	personal and group characteristics	
<sup>1</sup> TA	age	
	RT +LJ stage of life	
	RT +TN student	
<sup>2</sup> TA2	. prenatal	
	ST <i>unborn</i>	
	RT LJ2 birth	
<sup>2</sup> TA4	. infant	
	SN Age 0 - 12 months.	
	RT LJ4 infancy	
<sup>3</sup> TA4.2	. . neonate	
	SN Age 0 - 4 weeks.	
	ST <i>infant, newborn</i>	
	ST <i>newborn</i>	
<sup>2</sup> TA6	. child	
	SN Age 0 - 12 years.	
<sup>2</sup> TA8	. teenager	
	SN Girl age 11 - 18, boy age 13 - 19.	
	ST <i>adolescent</i>	
	ST <i>pubescent</i>	
	ST <i>youth (young person)</i>	
	NT +TZ2.2 high risk youth	
	BT +TZ4 special populations	
	RT +LJ6 youth (stage of life)	
	RT LJ6.4 adolescence	
	RT TN6 junior high school student	
	RT TN8 high school student	

Figure 7. AOD annotated hierarchy revised. (Over)  
(Page breaks and headers removed to conserve space)

- <sup>3</sup>TA8.2 . . . pregnant teen
  - BT +TZ2.2 high risk youth
- <sup>2</sup>TA8.4 . . . teenage mother
  - BT +TZ2.2 high risk youth
- <sup>2</sup>TA10 . . . adult
  - SN Age 18+
- <sup>3</sup>TA10.2 . . . elderly
  - SN Age 65+, sometimes 55/60+. The term "senior citizen" is sometimes used for an age group starting with 55 or 60, and could be considered a broader term including elderly. For purposes of this thesaurus, it was decided not to make this fine distinction.
  - ST *aged person*
  - ST *geriatric*
  - ST *older adults*
  - ST *senior citizen*
  - BT +TZ4 special populations
  - RT LJ8.6 old age
  - RT TU2.2.2 nursing home resident
  
- <sup>1</sup>TN student
  - RT +TA age
- <sup>2</sup>TN2 . . . preschool student
- <sup>2</sup>TN4 . . . elementary student
- <sup>2</sup>TN6 . . . junior high school student
  - ST *junior high student*
  - RT +TA8 teenager
- <sup>2</sup>TN8 . . . high school student
  - RT +TA8 teenager
  
- <sup>1</sup>TU status by personal life/family arrangement
- <sup>2</sup>TU2 . . . status by type of neighborhood of residence
- <sup>3</sup>TU2.2 . . . institutional resident
- <sup>4</sup>TU2.2.2 . . . nursing home resident
  - RT TA10.2 elderly
  
- <sup>1</sup>TZ high risk group and special population
- <sup>2</sup>TZ2 . . . high risk group
- <sup>3</sup>TZ2.2 . . . high risk youth
  - NT TA8.2 pregnant teen
  - NT TA8.4 teenage mother
  - BT +TA8 teenager
- <sup>4</sup>TZ2.2.2 . . . runaway youths
- <sup>2</sup>TZ4 . . . special populations
  - NT +TA8 teenager
  - NT TA10.2 elderly

Figure 7. AOD annotated hierarchy revised. (Continued)  
 (Page breaks and headers removed to conserve space)

Lastly, the program can produce **output files for use with an information retrieval package**. In particular, the program can construct, from a hierarchy with cross-references, an **expanded hierarchy for inclusive (hierarchically expanded) searching**. The regular hierarchy shows each descriptor at one place in the linear hierarchy, with one notation, and expresses additional relationships through cross-references. In the expanded hierarchy (Figure 8a), a descriptor appears under each of its broader terms and thus has multiple notations (as in the Medical Subject Headings "Tree"). For example, *runaway youths* appears as TA8.6.2, TZ2.2.2, and TZ4.2.6.2. TermMaster's expansion preserves the structure of the hierarchy and the original notations, inserting additional descriptor listings at the appropriate place and creating the additional notations. If a whole branch of the hierarchy is repeated in a second location, it maintains its original structure. The expanded hierarchy is useful for implementing inclusive searching in a brut-force approach: Use the alphabetical listing shown in Figure 8b to enrich bibliographic records through adding all the notations of a descriptor, thereby making the record retrievable from any broader descriptor in any system that provides truncation. Figures 8c and give an example with a more complex structure.

A last feature of TermMaster that should be mentioned is its system of status codes. Every term and every relationship is marked for each thesaurus as to whether it is fully accepted, should be reviewed, or has been rejected or deleted. Thus rejection/deletion decisions are fully documented and available when a term or relationship comes up for consideration again, for example when examining a newly published thesaurus for new terms and relationships.

TermMaster has **two modes of interaction**: batch (implemented) and online (under development). **Batch files** are convenient for entering and editing large linear hierarchies, which can then be input into the database. As described above, editing is accomplished through producing an output file for editing and re-input. The program assigns a special status code to all pieces of information in such a file. If a piece of information is still present when the edited file is re-input, the status code is changed back to valid; otherwise, the status code remains and the piece of information is considered deleted from the thesaurus being worked on. (The information stays in the database for check by a senior editor, if desired, and for later reference.)

The planned **online interaction** is term-based. A term has a screen displaying all the information about that term (relationships, scope notes) in the database, with source and status indication. (This it would show relationships previously deleted). After full-screen editing, the changes are made in the database. Online editing of a "live" linear hierarchy is desirable but requires a very high effort for implementation, particularly if one wants to make available word processor functionality.

There are, of course, many functions and detailed specifications of TermMaster that were not mentioned in this short paper, which emphasized special features not widely available on personal computers (TermMaster runs under MS-DOS; 486 and fast hard disk recommended).

<p><b><sup>0</sup>L</b></p> <p><sup>1</sup>LA</p> <p><sup>2</sup>LA4</p> <p><sup>3</sup>LA4.2</p> <p><sup>3</sup>LA4.4</p> <p><sup>3</sup>LA4.6</p> <p><sup>4</sup>LA4.6.2</p> <p><sup>4</sup>LA4.6.4</p> <p><sup>3</sup>LA4.8</p> <p><sup>4</sup>LA4.8.2</p> <p><sup>4</sup>LA4.8.4</p> <p><sup>4</sup>LA4.8.6</p> <p><sup>3</sup>LA4.10</p> <p><sup>2</sup>LJ</p> <p><sup>3</sup>LJ2</p> <p><sup>3</sup>LJ4</p> <p><sup>3</sup>LJ6</p> <p><sup>4</sup>LJ6.2</p> <p><sup>4</sup>LJ6.4</p> <p><sup>3</sup>LJ8</p> <p><sup>4</sup>LJ8.2</p> <p><sup>4</sup>LJ8.4</p> <p><sup>4</sup>LJ8.6</p> <p><sup>3</sup>LJ10</p> <p><b><sup>0</sup>T</b></p> <p><sup>1</sup>TA</p> <p><sup>2</sup>TA2</p> <p><sup>2</sup>TA4</p> <p><sup>3</sup>TA4.2</p> <p><sup>2</sup>TA6</p> <p><sup>2</sup>TA8</p> <p><sup>3</sup>TA8.2</p> <p><sup>3</sup>TA8.4</p> <p><sup>3</sup>TA8.6</p> <p><sup>4</sup>TA8.6.2</p> <p><sup>4</sup>TA8.6.4</p> <p><sup>4</sup>TA8.6.6</p> <p><sup>2</sup>TA10</p> <p><sup>3</sup>TA10.2</p>	<p><b>social sciences, economics, and law</b></p> <p><b>social psychology</b></p> <p>. stage of life</p> <p>. . birth</p> <p>. . infancy</p> <p>. . youth (stage of life)</p> <p>. . . childhood</p> <p>. . . adolescence</p> <p>. . . adulthood</p> <p>. . . young adulthood</p> <p>. . . midlife</p> <p>. . . old age</p> <p>. . death</p> <p>. stage of life</p> <p>. . birth</p> <p>. . infancy</p> <p>. . youth (stage of life)</p> <p>. . . childhood</p> <p>. . . adolescence</p> <p>. . . adulthood</p> <p>. . . young adulthood</p> <p>. . . midlife</p> <p>. . . old age</p> <p>. . death</p> <p><b>personal and group characteristics</b></p> <p><b>age</b></p> <p>. prenatal</p> <p>. infant</p> <p>. . neonate</p> <p>. child</p> <p>. teenager</p> <p>. . pregnant teen</p> <p>. . teenage mother</p> <p>. . high risk youth</p> <p>. . . runaway youths</p> <p>. . . pregnant teen</p> <p>. . . teenage mother</p> <p>. adult</p> <p>. . elderly</p>	<p><sup>1</sup>TN</p> <p><sup>2</sup>TN2</p> <p><sup>2</sup>TN4</p> <p><sup>2</sup>TN6</p> <p><sup>2</sup>TN8</p> <p><sup>1</sup>TU</p> <p><sup>2</sup>TU2</p> <p><sup>3</sup>TU2.2</p> <p><sup>4</sup>TU2.2.2</p> <p><sup>1</sup>TZ</p> <p><sup>2</sup>TZ2</p> <p><sup>3</sup>TZ2.2</p> <p><sup>4</sup>TZ2.2.2</p> <p><sup>4</sup>TZ2.2.4</p> <p><sup>4</sup>TZ2.2.6</p> <p><sup>2</sup>TZ4</p> <p><sup>3</sup>TZ4.2</p> <p><sup>4</sup>TZ4.2.2</p> <p><sup>4</sup>TZ4.2.4</p> <p><sup>4</sup>TZ4.2.6</p> <p><sup>3</sup>TZ4.2.6.2</p> <p><sup>3</sup>TZ4.2.6.4</p> <p><sup>3</sup>TZ4.2.6.6</p> <p><sup>3</sup>TZ4.4</p> <p><b>student</b></p> <p>. preschool student</p> <p>. elementary student</p> <p>. junior high school student</p> <p>. high school student</p> <p><b>status by personal life/family arrangement</b></p> <p>. status by type of neighborhood of residence</p> <p>. . institutional resident</p> <p>. . . nursing home resident</p> <p><b>high risk group and special population</b></p> <p>. high risk group</p> <p>. . high risk youth</p> <p>. . . runaway youths</p> <p>. . . pregnant teen</p> <p>. . . teenage mother</p> <p>. special populations</p> <p>. . teenager</p> <p>. . . pregnant teen</p> <p>. . . teenage mother</p> <p>. . . high risk youth</p> <p>. . . . runaway youths</p> <p>. . . . pregnant teen</p> <p>. . . . teenage mother</p> <p>. . elderly</p>
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Figure 8a. AOD expanded hierarchy for inclusive searching.

"adolescence", "LJ6.4.; LA4.6.4."  
 "adult", "TA10."  
 "adulthood", "LJ8.; LA4.8."  
 "age", "TA."  
 "birth", "LJ2.; LA4.2."  
 "child", "TA6."  
 "childhood", "LJ6.2.; LA4.6.2."  
 "death", "LJ10.; LA4.10."  
 "elderly", "TA10.2.; TZ4.4."  
 "elementary student", "TN4."  
 "high risk group", "TZ2."  
 "high risk group and special population", "TZ."  
 "high risk youth", "TA8.6.; TZ2.2.; TZ4.2.6."  
 "high school student", "TN8."  
 "infancy", "LJ4.; LA4.4."  
 "infant", "TA4."  
 "institutional resident", "TU2.2."  
 "junior high school student", "TN6."  
 "midlife", "LJ8.4.; LA4.8.4."  
 "neonate", "TA4.2."  
 "nursing home resident", "TU2.2.2."  
 "old age", "LJ8.6.; LA4.8.6."  
 "personal and group characteristics", "T."  
 "pregnant teen", "TA8.2.; TA8.6.4.; TZ2.2.4.; TZ4.2.2.; TZ4.2.6.4."  
 "prenatal", "TA2."  
 "preschool student", "TN2."  
 "runaway youths", "TA8.6.2.; TZ2.2.2.; TZ4.2.6.2."  
 "social psychology", "LA."  
 "social sciences, economics, and law", "L."  
 "special populations", "TZ4."  
 "stage of life", "LJ.; LA4."  
 "status by personal life/family arrangement", "TU."  
 "status by type of neighborhood of residence", "TU2."  
 "student", "TN."  
 "teenage mother", "TA8.4.; TA8.6.6.; TZ2.2.6.; TZ4.2.4.; TZ4.2.6.6."  
 "teenager", "TA8.; TZ4.2."  
 "young adulthood", "LJ8.2.; LA4.8.2."  
 "youth (stage of life)", "LJ6.; LA4.6."

Figure 8b.  
 Export file with expanded hierarchy

<sup>0</sup> AB	term AB
<sup>1</sup> AB2	term AB2 NT +AB4.2 term AB4.2
<sup>1</sup> AB4	term AB4 NT +AB6.2 term AB6.2 NT +AB14 term AB14 NT +AB16 term AB16 BT +AB12 term AB12
<sup>2</sup> AB4.2	term AB4.2 NT AB6.2.4 term AB6.2.4 BT +AB2 term AB2
<sup>2</sup> AB4.4	term AB4.4
<sup>1</sup> AB6	term AB6
<sup>2</sup> AB6.2	term AB6.2 NT AB10 term AB10 BT +AB4 term AB4
<sup>3</sup> AB6.2.2	term AB6.2.2
<sup>3</sup> AB6.2.4	term AB6.2.4 BT +AB4.2 term AB4.2
<sup>1</sup> AB8	term AB8
<sup>1</sup> AB10	term AB10 BT +AB6.2 term AB6.2
<sup>1</sup> AB12	term AB12 NT +AB4 term AB4
<sup>1</sup> AB14	term AB14 BT +AB4 term AB4
<sup>2</sup> AB14.2	term AB14.2 NT +AB16 term AB16
<sup>2</sup> AB14.4	term AB14.4
<sup>1</sup> AB16	term AB16 BT +AB4 term AB4 BT +AB14.2 term AB14.2
<sup>2</sup> AB16.2	term AB16.2
<sup>2</sup> AB16.4	term AB16.4 NT AB18 term AB18
<sup>3</sup> AB16.4.2	term AB16.4.2
<sup>1</sup> AB18	term AB18 BT +AB16.4 term AB16.4

Figure 8c.  
 Expanded hierarchy. More complex example. Base hierarchy.

PROCEEDINGS OF THE 5th ASIS SIG/CR CLASSIFICATION RESEARCH WORKSHOP