ABSTRACT
                 The fields of social and cognitive psychology and
political science have offered several experimental designs for
assessing the presence, type, and complexity of scripts (memory
structures used to encode knowledge of an action) or event schemata.
Script measurement is a potentially valuable tool for the study of
information and news processing because the mass media typically
present action-based sequences similar in nature to scripts. Most of
the studies aimed at demonstrating the presence of a schema rely on
hypothetical passages and indirect measurement strategies based on
recall tests, clustering of related concepts, and inference based on
prior knowledge. The study of information processing has focused on
consensual or shared schemata--similar images for action-based or
event stimuli shared by people in general. Media researchers are
especially concerned with the assumption that people select specific
schemata when processing various types of information supplied by the
media--politics, sports, and weather, for example. The external
validity of schema measurement has not been sufficiently assessed,
though internal validity is rarely a problem in properly conducted
experimental research characterized as a posttest only control group
design. For the study of news and information processing, external
validity should be sought using real news and information for
stimulus material rather than hypothetical passages. References are
included. (SRT)

METHODOLOGICAL APPROACHES TO SCHEMA MEASUREMENT:

Applying 'Script' Measures to Mass Media Information Processing

Robert H. Wicks is a doctoral candidate in the Mass Media program at Michigan
State University.

ABSTRACT

Schema measurement is a new frontier for communication and
social cognition researchers. Recent research provides evidence
that the schema concept may have significant utility in terms of
explaining the processing of news and information in the mass
media. But a variety of scholars have argued that adequate
measurement approaches must be linked to the schema construct if
it is to move toward acceptance as a formal theory. This report
addresses this point.

Researchers in the domain of cognitive social psychology and
political science have offered measurement approaches aimed at
assessing the degree to which people employ consensual schemata.
These approaches are rooted in conventional measurement
techniques such as recall examinations, cluster analysis and
inferential testing. This paper will offer a critique of these
methods and provide a set of hypothetical examples illustrating
the manner in which communication and mass media researchers may
benefit from script measures.

ERIC

The purpose of this report is to review and explore the various approaches to schema measurement. The specific form of schema measurement to be considered is that of event schemata or 'scripts.' Both terms are synonymous and refer simply to action-based schemata. Schank and Abelson (1977) use the term script to refer to the memory structure a person uses in encoding his general knowledge of a certain situation-action routine. Approaches to 'script' measurement will serve as the focus since news and information provided in the mass media is typically presented in action based sequences similar in nature to scripts as conceptualized by Schank and Abelson.

Social psychologists and political scientists have offered several experimental designs aimed at assessing the presence, type and complexity of scripts. Experimental approaches permit manipulation of messages. Only a single study of interest to media researchers has utilized survey data in the course of schemata measurement (Lau, 1984). Graber (1984) used the schema construct to explain the findings of her panel study on political information processing, but she made no attempt to quantify the schemata used by the members of the panel.

The experimental design typically employed might best be described as conforming to the posttest-only control group design. Campbell and Stanley (1966) explain that true experimental designs employ methods of randomization to assure that all groups are equal prior to introduction of the stimulus. Most of the work in schema measurement has conformed to this

1

requirement. But recent experiments have emphasized individual difference among groups studied leading to assignment to a treatment group based upon a variable such as expertise. These emerging measurement approaches rely on quasi-experimental approaches. Therefore, script measurement is possible in both experimental and quasi-experimental settings.

Virtually all of the experimental research approaches involve instructions to subjects designed to invoke a specific schema. Stimulus materials (normally in the form of a topical text concerning the schema hypothesized schema) are then introduced to the subjects. The subjects are then tested to evaluate presumed script guidance of message processing. Measures commonly used include: 1. recall tests; 2. clustering of related concepts and 3. inference based on prior knowledge.

This paper is concerned with schemata measurement as it applies to communication and mass media researchers. The focus will therefore center on script measurement--a specific type of schema measurement. Following a general overview of script measurement approaches, the focus of this report will shift to an assessment of political schema measurement. Processing of political information has been singled out since it accounts for the greatest volume of news and information provided by the media. In addition, some work in political script measurement has already been conducted providing a foundation upon which to build. Hypothetical examples will be provided during the course of this report to facilitate an understanding of the experimental designs and methods to be introduced.

2

HEMA THEORY: THE USE OF INDIRECT SCHEMATA MEASURES

iled theoretical analyses of the schema concept have
vided by authors in social psychology (Fiske & Taylor,
stie, 1981; Norman & Bobrow, 1975), political science
1973; Lau, 1984) and communications (Reeves, Chaffee &
82). Several plausible models detailing the scheme
n process have been suggested by these authors. But
eoretical models must be supplemented with workable
designs and measurement approaches to be of utility.
archers have alternately used terms such as prototypes
& Mischel, 1977) and social scripts (Schenk & Abelson,
describe active information processing and retrieval.
Lippmann first wrote of stereotypes--a precursor to the
tion--in 1922 in his classic work Public Opinion. Schema
uggests that in the course of information processing,
s with expertise in a given topical domain typically
veral schemats rather than a single schema. Conversely,
th limited experience in a domain typically use fewer
(or a single schema) in evaluating information.
abstractness of the schema concept prompted early
s to simply 'assume' the presence of schemata in
n processing. This assumption stemmed from the
lity of techniques capable of getting inside peoples'
valuate the presence or sophistication of a particular
But during the past decade, several indirect approaches

3

to schema measurement have been employed that to so
circumvent this problem. These techniques have helped
the foundation upon which the schema notion rests.

While less than perfect, these indirect measures pr
pathway whereby the schema notion may move toward accept
formal theoretical construct. Most of the studies
demonstrating the presence of a schema rely on me
approaches that test recall, evaluate inferential cap
and assess the tendency of an individual to cluster
concepts.

Cognition researchers propose that high re
information is related to well developed schemata s
information is assimilated easily into a developed
Clustering of concepts measures the manner in which peo
related concepts together. Inferential abilities are as
represent schema presence and sophistication since peo
well developed schemata for a particular domain typicall
easier to draw on past experience to fill in missing inf
Researchers typically use several measures concurrently
the validity of the scores obtained. A close watch i
kept on the experimental design to assure reliable resul

The communication field has a rich research trad
evaluating the effects of media messages on audiences
society. Research has focused on topics such as the i
television on children and potential for media inspire
behavior. Much of this work is based on theoret
methodological approaches advanced in social psychology.

4

6

7

d measurement offers the promise of putting this past
into context. It promises explanations as to why
messages have an effect on certain people leading to
responses and behavior. Schema theory offers the
to explain different impact of messages on different
of the audience. Quantitative measurement offers the
of assessing the degree to which people consensually
scripts in information processing. While less precise
suring column inches in a newspaper or counting stories
evening news, schema measurement promises useful
on the extent to which the messages serve a purpose.
l psychologists suggest that several concurrent
measures such as recall, inference and clustering offer
that people indeed call upon similar or different
in the course of information processing. Schema
t concerns measuring the presence of generic knowledge
--not specific knowledge in a given topical domain.
s have typically invoked a schema--democracy for
and then assessed the manner in which people evaluated
on based upon the invoked construct.
rimental approaches have been the mainstay of schema
t techniques. But recent researchers have also begun
e survey approaches with some success. A measurement
ed on survey data will be evaluated presently. The
al approaches will be evaluated subsequently.

THE SURVEY APPROACH

Lau (1984) utilized open-ended survey questions fro
Center for Political Election Studies (CPS) at the Universi
Michigan as a gauge of schemata. Each of the survey que
introduced one of the four categories (issues, groups, part
candidate personality factors). The precise wording
question was as follows:

Now, I'd like to ask you what do you think
are the good and bad points about the **parties**. Is
there anything in particular that you like about
the **Democratic Party**? (If yes:) What is that?
Anything else?

Up to three responses were recorded. The questions p
the label for the schema--in this case **Democratic**
Respondents answered the questions based on upon the sum t
all of their knowledge concerning political parties. This
of inquiry is known as cued-free recall. Taylor and Fiske
suggest that this method is one of the least precise meas
schema content.

Lau (1984) acknowledged the limitations and deficienc
this technique suggesting that the responses inevitably
include a good deal of random noise, which will decrea
power of the analyses to find significant affects." Commo
provides most people with something to say about a 'po
party' or a particular 'politician' when provided wi
label--if for no other reason than to avoid creati
impression that they are uninformed. Recent work by
(1984) supports this proposition.

Schema theory rests on the assumption that general kn

5

6

8

...res guide processing of specific information. In order to
...is proposition, specific information must be provided to
...spondent and then followed up with measures believed to
... information processing capabilities. Accurate and
...te responses to survey questions may indeed demonstrate
...ence of a well developed schema. However, researchers
...ce again resort to simply assuming that it is the schema
...t specific knowledge) that has been tapped. The next
... of this report will endeavor to demonstrate that
...ntal procedures, with their manipulative capabilities
...re promise for the study of event schemata.

...RIMENTAL APPROACH

... bulk of literature on schema measurement comes from
...psychology, a science steeped and deeply rooted in the
...ntal tradition. Most schema research designs query
...als on a specific set of information or a 'knowledge set'
...as been provided by the experimenter. This enables the
...r to evaluate recall based upon the specifics of the
...ion provided. This approach guards against purely
...ral or improaptu answers.

...jects are typically presented with an unfamiliar
... set and then asked to answer questions or draw
...es. Schema theory suggests that individuals possessing a
...fined schema in that domain will have more success at
...f related information, infer more and tend to cluster
... concepts more than individuals with an ill defined
... It is this introduction of the knowledge set that makes

7

the experimental approach superior to the survey
Individuals are required to recall, cluster and infer
a specific knowledge set. Survey techniques drew up...
general knowledge. Thus, individuals with well defin...
in a given topical domain will process new information
that domain better than individuals with an ill define...
Unlike the survey technique, it is possible to eval...
greater precision the amount of a specific set of mess...
was processed.

Experimental approaches represent the most recent...
in the area of schema measurement. A variety of scho...
recently offered improvements on some of the earlier
precise measurement methods (Cantor & Mischel, 1979;
Feldman, 1981; Markus & Smith, 1981; Ostrom, Pryor
1981). The literature employing experimental approache...
outstrips any other approach to schema me...
The logical starting point in this inquiry into m...
approaches requires the specification of variables use...
research. Most studies in the past have manipulated e...
perspective of the individual or the label for a
schema. These manipulations have served as the i...
variables.

The amount of recall, inferential abilities and ...
of concepts have traditionally served as the dependent
The oldest literature on measurement of consensual sc...
barely a decade old. A review of this emerging body o...
literature may be in order.

8

10

11

e and Kinder (1981, pg. 173) report that research
d "in schema terms has demonstrated a preference for
and refining general principles of information
g." Much of this work has focused on consensual or
hemata. Experiments on consensual schemata have tested
hesis that people share schemata--that people in general
p similar images for action based or event stimulus
Abelscn and Schenk (1977) propose that part of our
is organized around hundreds of stereotypical
with routine activities. Examples would include
a dentist or ordering a meal in a restaurant. This
n is supported by a series of recent studies (Anderson
t, 1978; Bower, Black and Turner, 1979; Fiske, Taylor,
Leufer, 1979). But more recent work also suggests that
differences provide for substantially different levels
sing of information based on script development (Fiske,
arter, 1983; Graber, 1984; and Markus, 1977).

, Black and Turner (1979) suggested that consensual
e rooted in a form of 'cultural uniformity' which tends
people to share perceptual stereotypes concerning the
which certain routine typical events unfold. They
ed that subjects presented with a hypothetical scenario
information or misremember facts from a story based on
expected to transpire. The researchers operationalized
thesis by asking student subjects (N=161) to generate a

script (dependent measure) based on their expectations
series of common events such as "ordering a meal in a re
(independent variable) should unfold. They then asse
consensual agreement on characters, props, action cont
the other elements of the stories generated.

But they went further than simply reporting that pe
to conceptualize social information in a similar fash
researchers tested recall on implied information by
second set of respondents (N=18) to read a series of
stories. Each story was different but many were related
of general themes. For example, stories entitled "Th
"The Dentist" and "The Chiropractor" were all includ
subjects then wrote down all of the information they cou
about certain stories. The results were subjected to an
which stated actions were compared to unstated script ac
finally to other actions.

In another experiment, Bower, Black and Turner (19
subjects (N=12) to study two sets of actions--one set c
actions for a script in a logical order and a second set
action items incorrectly arranged (independent variable
then asked the respondents to arrange a set of cards d
the actions in the original order (dependent measur
results were analyzed using ANOVA to determine whethe
misremember information to make it conform to the en
script.

Anderson and Pichert (1978) looked at the processin
directed social events in another set of experime

12

13

measure was level of processing based on information
rooted in the directives of the researcher. The
ent variable was goal directed processing operationalized
g respondents to assume a given perspective. Students
ad a story about the behavior of two boys while skipping
The action in the text was set in the home of one of the
he passage contained information of interest to a
ve home buyer and a burglar. A total of 72 facts (or
s) were provided.

of the students were assigned to the group asked to
text from the perspective of a burglar (burglar schema)
other half read it from the perspective of a home buyer
er schema). Then they wrote down all they could recall
e story. After a distractor task, the students were
ed to recall facts from the story but half of each group
to do so from the other perspective. The researchers
lied the recalled facts from the differing perspectives
ate whether or not processing was different depending
perspective of the individual attempting to retrieve the
on. An ANOVA performed on the data suggested that
ons to take a new perspective led subjects to invoke a
t provided cues for processing of different categories
nformation.

, Taylor, Etcoff & Laufer (1979) explicitly instructed
ubjects (N=50) to take the point-of-view of individuals
they provided. The researchers instructed the students
an accident from the point of view of the motorcyclist

11

or the cabbie involved in the mishap or from the perspe
spectator. The set of experiments were designed to t
based on visual point-of-view influences. The students
series of questions based on a text they had read
accident. The questions probed specific details such
of the events leading up to the accident. The stud
assessed responsibility for the accident to one of th
involved. The recall and attribution data were each
separately.

The independent variable in this experiment
perspective of the person reading the text. The
measures were drawn from the answers to the open-ended
An ANOVA involving recall suggested that recall is enhan
on visual perspective and goal orientation. Of prime
this study is that people selectivly processed visual
all of the information was semantically equal. Each st
instructed to read the text from a particular point
Specific groups of people processed information in
manner based on a point-of-view schema invoked
researchers.

These experiments have tended to demonstrate th
apparently conceptualize simple action-based routines in
fashion. But what of more complex scripts? Can we
fact that individual differences in people may caus
variation based upon socio-cultural differences in peopl

It is this very point that Markus addressed
pioneering work on individual differences in self

12

14

15

1977; Markus & Smith, 1981). Markus hypothesized that

_ma will determine the type of self-judgments that are

_ that these judgments will vary in latency depending on

_ence and content of self-schemata.   She also predicted

_ividuals with self-schemata (operationalized as highly

_ or independent) should find it easier to describe

_ behavior that is related to their schema and should be

_y more certain about prediction of their behavior along

_nsion than individuals with an ill-defined self schema.

_ua (1977) demonstrated that people process information

_ly depending upon the degree to which a particular

_ domain is salient. She used the term 'schematic' to

_ individuals with significant interest or knowledge in a

_r stimulus domain. 'Aschematic' conversely refers to

_la with little or no knowledge or interest in a

_r domain.   The specific design and measurement

_s utilized in this research are of little importance

_a researchers since design and measurement techniques

_ in the evaluation of self-schema are strikingly

_from those employed in script analysis.   But this work

_nguished because of the design and measurement

_tions--that of individual differences--are clearly an

_ concern to news and information providers.

_a provided a foundation upon which others have built.

_Koeske (1983) proposed that knowledge possessed by

_n a given topical domain) is deeper (they possess more

_ and concepts are better integrated) than knowledge

13

possessed by novices in that domain. Their work reflect_

underpinning of schema theory--that 'experts' may be exp_

draw on more schemata when processing information t_

'novices.'   It should be noted that use of the_

(aschematic) and the expert (schematic) dichotomy is not_

to imply that all people can be neatly categorized as on_

the other. Categorization of people simply represents_

on a continuum, thereby establishing the variance essen_

experimental research.

Fiske, Kinder and Larter (1983) suggest that_

understanding depends vitally on past experience a_

individuals will vary enormously in both the availab_

schemata and how available schemata are used.   The "po_

involved should differ from the uninvolved in their proc_

information about politics: in the nature of schemata_

to them, in the ease by which such schemata are invoked_

facility with which such schemata are employed in in_

processing."   As such, assimilation of information s_

facilitated if an individual is politically astute.

Fiske, Kinder and Larter (1983) designed a s_

experiments intended to evaluate specific differe_

political information processing.   They assembled a_

political 'experts' and a group of political 'novices_

operationalized this concept by evaluating individual l_

political involvement using standard measures provided_

Center for Political Studies at the University of Michig_

researchers predicted that political experts and novic_

14

information consistent with their shared prior knowledge
t they hypothesized that the experts would also use
ion inconsistent within the knowledge set provided. This
ted by asking students (N=82) to participate in a media
The researchers prepared a text about Mauritius, a little
untry in the Indian Ocean. The text was laden with
tending toward democratic and communirtic forms of
t. The opening sentence of the text manipulated the
set by suggesting the country was communistic,
c or neither (independent variable).
students were then asked to recall as many facts as
They also made inferences about the country by
answer to questions not included in the text. Amount
l was measured by counting the facts recalled and
g the recall data to an ANOVA on knowledge (communist/
c/neither) by expertise (high/low) by information type
t/democratic). Inferences were analyzed using an ANOVA
edge set (communistic/democratic/neither) by expertise
). The researchers also utilized a measure of
l clustering (Adjusted Ratio of Clustering) which
the manner in which like concepts cluster together.
relevance of all of the individual difference studies
summarized (Fiske & Kinder, 1981, pg. 177).

"Through practice, experts acquire more-and
complexly organized knowledge, which includes
egies for dealing with particular domains.
knowledge structures-in our theoretical
ulary, schemata-encompass both declarative
dge (descriptions of attributes) and
dural knowledge (rules or strategies for the
f that knowledge)."

15

These experiments suggest that people tend to con
action based routines in a similar fashion based in larg
cultural norms dictated by the society. Yet differin
roles (among other reasons) accounts for individual d
in people. Thus schema measurement offers the oppor
assess the degree to which people share action based st
Script analysis provides a specific blueprint for assu
information is assimilated easily for audience se
aggregates. However, each topical domain must be
individually. This suggests that instead of simply
people on general information preferences such as featu
versus political news, it is essential to dissect each
of news. Such an approach will inevitably involve co
refinements of the measurement approaches that have her
explored.

Political information will serve as an appropriate
point in this endeavor since some work in this area ha
commenced. The following section will provide a
rationale for the selection of political information.

SCHEMA USAGE IN POLITICAL INFORMATION PROCESSING

Scholars since Lippmann (1922) have proposed that
schemata in the course of news and information processi
concern to media researchers is the assumption that peo
specific schemata when processing various types of i
(politics, economics, sports, weather, etc.) suppl
media. Schema measurement hinges substantially

16

19

18

...ication and measurement of consensual schema usage among
...e members.

...litical information offers promise with regard to schema
...ment for the following reasons.

> Political schemata have been studied and
> analyzed in the political science literature:
> As such. suitable measurement models may be
> applied in attempting to segment audiences
> based on consensual schemata.

> Proliferation of political information:
> Political information seems an appropriate
> starting point in analyzing the manner in
> which information and consensual schemata
> interact since political news and information
> is presented with greater regularity than any
> other type of information.

...litical information is all around us. Gans (1979, pg. 16)

...that approximately 35% of all of the news stories on

...(network) news programs are political in nature. If other

...ally tangential types of news stories are included. the

...rises to above 40%. A more recent content analysis

...1985) suggests that 30% of the stories on American

...k) newscasts are primarily political and 53% deal

...ially with politics. The sheer volume of political

...s to which people are confronted on a daily basis makes it

...l choice for the study of applying schema theory to news

...ormation processing.

...litical information provides an excellent opportunity for

...y of schema measurement for a variety of other reasons as

...ost Americans remain rather indifferent to, and generally

...nformed about. much of what transpires in the political

...despite the sheer volume of political information to which

17

the average person is exposed (Converse. 1975; Sears, 1969)

average person is extremely selective when approaching the

of political information available (Graber. 1984). The pote

for obtaining political information is relatively high but

average person's typical investment in developing pol:

expertise is relatively low (Converse. 1975; Downs.

Lippmann. 1922).

But while many people may process relatively

political information. political experts (Fiske. Kinder & Le

1983) apparently process and retain political information

relative ease. The political expert is believed to empl

greater number of schemata in the course of inforn

processing than does the novice. Politics allows the

assemblage of groups with widely divergent processing abil:

Graber (1984) is perhaps the first and quite possibl

only researcher to thus far conceptualize the

significance of schema research for mass media scholars.

absence of a trough full of literature in the communic

concerning schema application. an illustration of its pot

utility based upon a recent event will be sketched.

President Aquino in the Philippines recently captured

and national attention by striking a chord rooted in human

and democracy. National and world attention quickly focused on t

island because it presumably activated a related and well

schema--that of people taking charge of their lives.

Effectively striking a well defined communal schema ine

paves the way for transmission of information capable of s

a collective chord among audience members thereby lead

enhanced audience loyalty and increased size.

18

20

EXAMPLES OF SCRIPT MEASUREMENT APPROACHES

arch literature from the past decade clearly suggests
ople share stereotypical scripts. Cultural norms, for
dictate the set protocol be employed in the course of
ut at a restaurant. These norms lead to shared conceptual
f typical action-based events or consensual script. But
esearch does not to imply that scripts are identical or
t between people. The restaurant script of a wealthy
may include tipping of the maitre d'--an attribute not
ily included in the dining out script of the less well-

how might media researchers utilize such research? A
of hypothetical examples will be provided intended to
an explanation of the potential applied significance of
easurement in media research.

pose the anchorman on the evening news reports that an
le accident has taken place. Mere mention of the
may prompt people to visualize the scene of an
le accident. Generic accident pictures based on prior
ce and stored in the mind will be summoned to create a
accident script. More of the script may be filled in if a
is told that an antique Corvette and a school bus
And more still if the person knows that the accident
at the corner of Elm Street and Vine. But will the
ttend to information about the accident provided on the
news? The answer is yes if the information is schema
But if people share consensual schemata, what makes an

19

event schema-relevant for one person and schema-irre
another. The following example from political science
top clarify the picture (Converse, 1975. pg. 97).

EXAMPLE 1

"If an informed observer hears a surprising
policy statement in the news by the secretary of
defense, he may prick up his ears and pay close
attention. He related this information to what he
knows of recent policy, what he knows of the
secretary's relationship to the president, what he
knows of past positions the secretary may have
taken, and the like, since he is intensely
interested to detect even small reorientations of
national policy. In short, he automatically
imports enormous amounts of prior information that
lands the new statement high interest.
The poorly informed person hearing the same
statement, finds it as dull as the rest of the
political news. He only dimly understands the role
of the secretary of defense and has no vivid image
grounded in past information as to the inclinations
of the current incumbent. His awareness of current
policy is sufficiently gross that he has not
expectation of detecting nuances of change. So the
whole statement is confronted with next-to-no past
information at all, hence is just more political
blather: in five minutes he probably will not
remember that he heard such a statement, much less
be able to reconstruct what was said.

This example clearly illustrates the range of

political schemata possessed by two different people.

to measure consensual schemata, it will be essential

schemata in a relatively large sample and then find

Lau developed his typology of schemata typically emp

political information processing from the election

carried out by the Center for Political Studies at the

of Michigan. This typology will serve as a starting

political schema measurement since it offers the opport

evaluate several of the fundamental political concepts.

20

23

exhaustive--indeed--more or fewer categories could be

However, it seems to offer broad knowledge bands while

ng certain specific characteristics to each component of

ogy. The typology includes issues, political parties,

(politician) personality factors and attributes

d with specific social groups. While information

and most people use each of these schemata at certain

t seems possible that people may use greater or lesser

f these schemata based upon individual differences such

iae. Consider this example.

EXAMPLE 2

Suppose that 70% of the people who are exposed
political information through the television
media rely primarily on their 'politician'
a in interpreting the information. And suppose
nation suppliers typically invoke the 'issues'
perty' schema in the course of presenting the
nation.
Neither the audience nor the information
ler derives maximum utility from the message
this scenario. Quite simply, the messages are
nted in a manner which is difficult for the
ity of the people to process. And the
nation supplier runs the risk of losing
nce members unable to process the information.

he measurement is essential to evaluate which schemata,

what extent these schemata, are used by members or

of the audience. Thus specification of shared schemata

eople is essential if media information suppliers

y wish to provide information in e highly processable

to a definable (presumably large) audience segment or

of segments.

l testing of information processing is related to

on recall. Social psychologists suggest that accurate

and abundant recall reflects efficient information proc

And the literature suggests that recall testing is an es

element of all script measurement. But heretofore, the sp

concerning recall measurement have been skirted. This w

remedied in the example to follow.

Hypothetical Example Of Recall Testing

Consider this scenario. A group (N=100) of individ

asked to view a television newscast with equivalent amou

the four types of political information identified by Lau

independent variable will be goal directed information pro

and the dependent measure will be absolute recall. Fiske,

and Larter (1983) have done work similar to the example be

EXAMPLE 3

Suppose a sample (N=100) is divided into five
equal groups (N=20 per group). They are asked to
view political stories embedded in a newscast. A
total of 20 political facts is provided. (Five
facts for each of the four schemata are offered).
Group 1 is told they will be asked to recall
party information. Group 2 is told they will be
asked to recall candidate (politician) personality
factors. Group 3 is told to recall issues
information. Group 4 is told they will be quizzed
on group information. Group 5 (control) is told
that they will be asked to recall the information
in the newscast. Each subject views the newscast.
Each subject is then asked to recall the
information they were directed to process. After
this task is complete, they will be asked to recall
each of the other categories of information.
Each response might then coded using the four-part
typology for political information (issues, groups
pertiai or politicians). The results will be
subjected to an ANOVA in which goal directed
processing may serve as the independent variable
and recall of information specific to the
categories will serve as the dependent measure.

...pothetical ANOVA table has been provided below. The data
...that each group successfully performed the task of
...g the specific information requested better than the
...ee types of information. However, the table also
...that people tend to process group oriented information
...:all = 2.8) with relative ease and issue related
...on (mean recall = 1.6) comparatively poorly.

...HETICAL MEAN RECALL OF POLITICAL INFORMATION IN NEWSCAST
Knowledge Set

| ...up | Info. | | | | | Mean |
(100)	Type	Party	Cand.	Issues	Group	Recall
N/20)	Party	2.8	1.6	1.2	2.8	2.1
N/20)	Cand.	2.1	2.8	1.3	2.7	2.2
N/20)	Issue	2.0	1.7	2.0	2.5	2.1
N/20)	Group	2.0	1.8	1.4	3.2	2.1
N/20)	Control	1.8	1.9	2.1	2.6	2.1
		2.1	2.0	1.6	2.8	

...mation yielded from this table may guide media
... managers on efficiently supplying information to the
...It may also for example, alert media managers to the
...y that people in a given market process information
... issues poorly. Therefore, special attention may be
...the manner in which issues are portrayed through the
...rification and simplicity in presentation are essential
...ive message transmission.

...results of the measurement approach above may provide
...ployable guidance for programming based on consensual schemata for
...al populace. However, this approach can be easily
...for specialized audiences. Suppose for example that a
... decides to tailor the message for political elites.

23

He may simply follow the path forged by Fiske, Kinder a[...]
(1983) in measuring the processing abilities of specific [...]
segments. Using political involvement, for example [...]
criterion variable, news managers may study processing t[...]
of specific audiences.

<u>Hypothetical Example Of Adjusted Ratio of Clustering (ARC)</u>

The second measure known as the adjusted ratio of cl[...]
(ARC) method (Bousfield & Bousfield, 1966; Ostrom, [...]
Simpson, 1981; Roenker, Thompson & Brown, 1971) inde[...]
deviation of clustering from levels based on chance. Cl[...]
in free recall identifies the presence of schem[...]
demonstrating that items within similar categories [...]
cluster. Conceptual clustering of concepts provides [...]
that people do group thoughts and ideas--a major as[...]
underlying the schema theory

Schema theory suggests that people cluster similar [...]
as a strategy to organize social information. Supp[...]
example that a group of subjects are read a list of wor[...]
contains the names of animals randomly interspersed an[...]
names of flowers. Researchers have found that the order [...]
items are listed in free recall reflects their associa[...]
organized memory. Specifically, subjects with well [...]
animal and flower schemata will cluster the animals in o[...]
of the recall sequence and flowers in another (Ostrom, [...]
Simpson, 1981).

A number of indices for clustering of free recall h[...]

24

27

26

The relative advantages and disadvantages of many of

clustering methods have been outlined by Shuell (1969).

method--the Adjusted Ratio Clustering (ARC) technique--

lated highly (.90) with other measures (Ostrom, Pryor &

1981). For this reason, it alone will be considered.

e derived from ARC measures represents the ratio of

category repetitions above chance to the total possible

repetitions above chance (Ostrom, Pryor and Simpson,

he following equation represents the theoretical ARC

g formula.

$$ARC = \frac{R-E(R)}{Max\ R-E(R)}$$

the total number of observed repetitions. (A repetition
is defined as occurring anytime two items from the same
conceptual category are reported contiguously.)
the chance number of category repetitions.
the maximum number of category repetitions

employ this technique, adjacent pairs of items must be

Since the raw number of adjacent pairs is confounded

l recall of each type, the clustering scores have to be

for the number of pairs expected by chance (Fiske,

arter, 1983) which in turn is a function of the number

n a given topical domain.

se a researcher was interested in demonstrating that

es' concepts cluster together. The following applied

y be employed in conceptual cluster analysis.

$$ARC = \frac{Ri-[Mi \div (N-1) \div k]^2}{(n-k)-[m \div (n-1)]^2}$$

25

where Ri = observed number of pairs (issues)
mi = total recall (issues)
N = total recall (issues, politicians, party and
k = number of categories = 4
m = maximum possible number of category repetition

The same formula will be used repeatedly for each

four concepts. The numbers generated will be summed acco

group end averaged. They will then be submitted to anoth

test in the following manner.

EXAMPLE 4

Suppose that two people with different levels
of political expertise are asked to watch a
television newscast which contains several
political stories. And they are directed to pay
attention to information that concerns social
'groups.' The total number of facts provided for
each category of information (parties, groups,
issues and candidates) is five for a total of 20
facts. The first person (Pa) recalls all of the
groups information contiguously and the clusters
related concepts in a bunches. The second person
(Pb) recalls very little of the information and
none of the concepts are clustered contiguously.
Such that:

Pa = AAAAADBBCBBCCCCDDBDD
Pb = ABCDABCD

    where Pa = the political "expert"
        Pb = the political "novice"
    And   A = facts recalled concerning political "grou
          B = facts concerning political "parties"
          C = facts concerning "politicians"
          D = facts concerning "issues"

Using the formula provided, it is possible to
generate a coefficient for clustering where perfect
clustering in this case would be .242 (as with Pa),
and poor recall with no clustering would
represent be -.35 (as with Pb). Clustering of 1.0
is possible only when a single category stimulus is
invoked. When multiple categories are invoked, the
perfect score drops.

26

2

emonstration of this techniques may help.

AAAAADBBCBBCCCCDDBDD

ject Pa clustered all of the A's (group concepts)
for a total of four pairs.   This person recalled five
oup concepts).   Total recall for A's (groups), B's
), C's (politicians) and D's (issues) was 20. The number
ories is four (issues, parties, politicians and groups).
um number of category repetitions for A's is four.
refore:

4

5                   $4-[5 \div (20-1) \div 4]$ 3.67

20   ARC=------------------- =   ----- =.242

4   2   15.15

4              $(20-4)-[4 \div (20-1)]$

HYPOTHETICAL CLUSTERING OF POLITICAL CONCEPTS
Knowledge Set

wledge el	Info. Type	Party	Cand.	Issues	Group	Mean Cluster
pert	Party	.21	.14	.17	.18	.18
a)	Cand.	.18	.22	.21	.19	.20
	Issue	.08	.14	.23	.20	.16
	Group	.12	.17	.19	.24	.18
vice	Party	-.26	-.23	-.30	-.35	-.29
b)	Cand.	-.30	-.28	-.19	-.35	-.28
	Issue	-.26	-.24	-.05	-.35	-.23
	Group	-.34	-.07	-.05	-.35	-.20

sual inspection of clustering table offers evidence that
lement and corraborate the recall table demonstrated
Specifically, the individual with the well developed
schemata (expert = Pa) clustered facts related to the
of political information better than novices.   Such a
uld be of little surprise. However, by combining and
the cluster scores of all of the individuals it is

27

possible to predict which components of the informatior
most easily processed by the greatest number of
Furthermore, as with the recall example, informatior
programmed for specific segments by grouping politica:
and novices separately.

It should be noted that the largest possible coeffi
any category in t..s example is .24.   By adding i
cluster scores together, it is possible to obtain ar
picture of total clustering.   And of course, a perfect
clustering in all categories would yield a 1.0.   In sc
where clustering and recall are extremely poor, the co
can go below -1.0. This instance is illustrated abc
example, summing the group scores above will yield -1.
suggests that positive and negative scores do not have
the same meaning. However, Ostrom, Pryor and Simpson (1
that negative scores larger than -1.0 are the exceptio
than the rule.

It should also be noted that the ARC formula i
tests recall as it tests clustering.   Recall is a pre
for any form of clustering. Concepts cannot be clustere
cannot be recalled. Thus the recall and clustering tabl
tend to reflect the same sorts of trends--although di
are not uncommon.   But taken together, they are as.
reflect the presence of an action schema or script.

28

31

30

third approach involves evaluation of inferential
ea. Typical inferential tests involve asking members
ject pool to infer from information not provided in the
set. The following example should facilitate an
ing of this approach.

EXAMPLE 5

iske, Kinder and Larter (1983) examined
dge-based strategies in political cognition
unction of expertise.
tudent subjects ware divided into experts and
based upon measures of political
ement developed by the University of
an's Center for Political Studies for use in
national surveys.
ubjects read a description of a previously
n third world country (Mauritius) after being
that it was communist, democratic or
ified. Concepts typically associated with
acies and communistic forms of government
interspersed throughout the article. An
e of a democratic concept was "An open and
press keeps Mauritian citizens informed about
al events and what is going on in
ment." An example of a communist concept is
tians generally do not speak out in
tion to the government." Subjects were not
hat Mauritiua ia actually a British Island in
dian Ocean.
he subjects in this experiment were then
to make inferences about Mauritiua. They were
questions like "How easy or difficult do you
it would be for a citizen to emigrate from
iua?" Note that none of the inference
ona were directly addressed in the text. All
es were provided on anchored 9-point scales.
e sum of these mentions waa submitted to an
s of Variance (ANOVA) on expertise
ow) by description (communiat/democrat).
ta suggeat that novice or low-involvement
a made inferences that were more consistent
he aet (or label) provided, while experta
ferences mora influenced by inconsistencies
description.

tudy conducted by Fiske, Kinder & Larter (1983)

suggests that the political novices simply begun the form
schemata based on the facts provided and the label given
text. The political elites conversely used d:
information and inconsistencies in formulating response
results suggest that differences in processing, b
available schemata, exist in the course of p
information.

RELIABILITY AND VALIDITY

Reliability concerns are paramount with regard to
measurement since this research area haa only recently
and is therefore comparatively unexplored. It has be
that schemata cannot be directly measured and that re
must often rely on indirect measures such as recall exam
clustering in free recall (ARC), and inferential testing.
also been pointed out in the literature review th
measures have recently been used concurrently to cross-cl
other.

Multiple indicators are typically used to as
reliability of the schema measures obtained. Several
taken concurrently reflecting aimilar patterns of proces
believed to validate each other. Social science rese
generally trusted only when several maasures demonatrate
especially when the focus of the research is in a relati
or unexplored measurement domain (Simon & Burnstein,
Schema researchers have uaed several techniques to get

on of thesa organized knowledge structures. But the
asure that permeates virtually all of the literature on
asurement is that of recall tasting.

testing has been employed in most of the studies during the past
nderson & Fichert. 1978: Bower, Black & Turner, 1979:
Evans & Fulero, 1978: Fiske, Kinder & Larter, 1983:
aylor, Etcoff & Laufer, 1979; O'Sullivan & Durso, 1984;
r & Cantor, 1978). But recall testing alone cannot be
d a reliable measure of schema presance or
ation. Hence inferential testing and clustering
have thus been employed to buttress the argument that
flects the knowledge contained within a schema.
arly work in script measurement (Bower, Black & Turner,
ied almost exclusively on recall testing. More recent
tended to include all three techniques (Fiske, Kinder &
1983). It should be noted that thesa two studies cited
peared in journals within a four year span and that new
t approaches will likely continue to emarge for the
future. But it is impossible at this point to assess
degree of certainty whether any of these approachas is
uperior to any other. These measurement approaches are
t neither meta-analyses nor Monte Carlo studies have as
bean conducted to assess the relative worth of these

he absence of formal studies of schema validity upon
draw, the measurement approaches will be critiqued in a
e fashion utilizing the formal definitions for "content

31

validity, criterion related validity and construct
(Zellar & Carminas, 1980).

Content or face validity is a system of using logic,
sense and previous work in the interest of specifyir
variables represent an abstract concept. Schema theory
the assumption that a script serves as the central pr
model for any given sequence of events encountered
individual. Individuals with well developed schamata in
domain will logically recall new information in that
battar than others with poorly developad schamata. Rec
serves as the dependent measure. Schema theory suggasts
information can be more easily assimilated when a
schema is available. This proposition seems plausible
probable from a common sense standpoint.

A person will also logically infer more from a
information if he possessas a wall developed schan
individual simply has a greater knowledge base upon which
and will find it easier to find parallel situations in
which sarve as a model for current incoming informatio
individuals well versed in a given topical domain will
cluster related concepts when asked to do so based upo
enhanced appraciation of the boundaries for a given conc
profassional baseball player will be able to cluster al
laague teams. Tha less interasted obsarver may includa
football teams in the list and fail to include several
teams.

Criterion related validity is established when the

32

35

a scale and a variable can be reasonably gauged. It is
ree to which an operational definition categorizes
in the same way as a well-accepted (or criterion)
t does. Criterion validity is normally gauged through
of a correlation coefficient to determine the degree of
on between the new measurement and the criterion
(Phillips, 1985). Criterion validity may come into play
ma measurement especially in development of the
t instrument and during the coding of open-ended

t measures typically ask people to recall facts based
knowledge set provided by the researcher. Coders must
the responses to assess the degree to which people
or grouped certain conceptual items. If the sorting
are too similar, for example, coders may fail to sort
ses in a similar fashion. High intercoder reliability
es appropriate analysis of the data. Criterion
refers to highly specific elements of the research
ther than the broad concepts assessed in the area of
face validity. If an experiment is set up in a manner
people comprehend and perform a given task properly and
is analyzed such that agreement is strong between
en criterion validity is high.

ardized tests such as the Graduate Record Exams (GRE)
predict the ability of an individual to perform in
school reasonably well. Tests of schema presence may
serve a similar predictive function by providing

33

guidance for information providers on shared p
abilities. But standardized tests such a GRE examinatic
had the luxury of time which has proven their validi
reasonable certainty. Coding of these tests is don
unambiguous fashion in which a correct (or incorrect) re
selected from several possible answers.

Unlike the GRE tests, schema measurement tests
limited research tradition upon which to draw.
especially vulnerable with regard to criterion
concerning schema measurement, the stimulus or knowledge
ideally be provided to all respondents under similar co
Each experimental subject must understand the directions
by the experimentor. But it is not essential that the
messages be comprehended equally by each subject. It i
these differences in comprehension and retrieval t
ultimately serve as evidence of schema presence (or
presence). Hence criterion validity hinges vital
intercoder agreement, development of an unambiguou
collection instrument and clear articulation of the t
performed.

Schema measurement is a new frontier for communicat
social cognition researchers. One may certainly make
that schemata do not exist--that the variables measured
reflect memory or chance clustering. But this argu
precisely the reason that measurement approaches a
explored. And it is this criticism that leads logically
domain of construct validity.

34

36

37

struct validity is present if the researcher can

ate that a scale measuring an abstract concept is related

r scales. Construct validity typically begins with a

is on how a set of ideas or concepts may be related.

ust then be developed to measure the concepts. Results

at with predictions tend to suggest that construct

is present.

is precisely this point which has been addressed by

rs during the past three years. Scholars of cognition

Fiske, Kinder and Larter (1983) have provided several

on the same responses to demonstrate that the results

One may argue that clustering of concepts is hopelessly

l with recall of facts since facts must be recalled

hey can be clustered. But the cluster scores obtained

e ARC measures will be considerably lower if the

l recalls a great deal but fails to cluster related

The scales used to measure scripts including recall,

and clustering have tended to yield the anticipated

ased on formal hypotheses. Agreement between scales, or

tending in the same direction suggest that the schema

ossesses construct validity when proper measurement

s are employed.

erforming experiments, researchers must be ever mindful

ems associated with internal and external validity.

validity is the basic minimum without which any

t is uninterpretable (Campbell & Stanley, 1966).

to the concept of internal validity is the question of

35

whether or not measurement is able to determine

experimental manipulation made a difference in a

instance. The research described in this report dem

clearly that people share consensual schemata and that

differences account for variation in schemata u

availability.

Internal validity is rarely a problem in properly

experimental research characterized as a posttest-only

group design. Campbell and Stanley note that all of th

associated with internal validity (history, maturation,

instrumentation, regression, selection and mortality)

controlled in this design. It is in the domain of

validity that this design is called into question.

External validity pertains to the generalizability

results of an experiment or to "what populations,

treatment variables and measurement variables can this e

generalized (Campbell & Stanley, 1966)." Virtually al

work on scheme measurement has been conducted in the l

using stimulus materials specifically designed to

schemata. More experiments demonstrating 'resl

applications of schemata will help this construct mov

formal acceptance.

The specific threat to external validity centers

types of experiments which have been carried out. Peo

typically been tested on consensually shared scripts of

nature such as ordering a meal in a restaurant. Or t

recall of facts pertaining to broad generic concepts ba

36

39

concept such as democracy or communism.   But do people

    employ scripts in the processing of day   day news

on? Do people employ different types of schemata in the

  processing specific types of information   provided   by

media?

    avoid ending on a string of questions, it must be

ged that the external validity of these measures is in

    Researchers have done little to assess the degree to

ple employ scripts in the course of processing news and

on.   Viewing a newscast with information concerning the

response to Libyan rocket fire over the Gulf of Sidra

y cause an individual to summon schemata different from

t may be employed in the course of processing a passage

and of Mauritius.

    the time is right to begin assessing the degree to

e measures may be considered externally valid. And the

followed in this regard involves using `real' news and

n for stimulus materials rather than hypothetical

    The measurement approaches discussed will serve as a

    for more elaborate approaches.   The schema concept

 some ripening--and measurement approaches will aid in

    But as Fiske and Linville (1980, pg. 553) note, "the

-headed overall view of the schema concept--or of any

mer--is to let a thousand conceptual flowers bloom."

37

REFERENCES:

Anderson, R.C., & Pichert, J.W. "Recall of previously unr
    information following a shift in perspective." Journ
    Verbal Learning and Verbal Behavior, 1978, 17, 1-12.

Axelrod, R. "Schema theory: An information processing mo
    perception and cognition." American Political Scienc
    Review, 1973, 67, 1248-1266.

Bousfield, A.K., & Bousfield, W.A. "Measurement of clu
    and of sequential constancies in repeated free re
    Psychological Reports, 1966, 19, 935-942.

Bower, G.H., Black, J.B. & Turner, T.J. "Scripts in
    text." Cognitive Psychology, 1979, 11, 177-220.

Campbell, D.T. & Stanley, J.C. Experimental and quasi-
    experimental designs for research. Chicago:Rand
    McNally, 1963.

Cantor, N., & Mischel, W. "Traits as prototypes: Effects o
    recognition memory." Journal of Personality and Soci
    Psychology." 1977, 35, 38-48.

Cantor, N. & Mischel, W. "Prototypes in person perception
    in Leonard Berkowitz (Ed.), Advances in Experimental
    Psychology (Vol. 12), New York: Academic Press, 1979.

Chi, M.T.H., & Koeske, R. "Network representation of a ch
    dinosaur knowledge." Developmental Psychology, 1983,
    29-39.

Converse, P. "Public opinion and voting behavior." In Nel
    Polsby and Fred Greenstein (Eds.), Handbook of Politi
    Science (Vol. 4). Reading, Mass.: Addison-Wesley, 197

Conover, P.J. and Feldman, S. "The origins and meaning of
    liberal/conservative self-identification." American J
    of Political Science, 25, 1981, 617-645.

Downs, A. An economic theory of democracy. New York: Harpe

Fiske, S.T. & Kinder, D. "Involvement, expertise, and sch
    use: Evidence from political cognition." In N. Cantor
    Kihlstrom (Eds.), Personality, Cognition and Social
    Interaction, Hillsdale, N.J.: Erlbaum, 1981

38

4.

.T., Kinder, D., and Larter, W.M. "The novice and the
ert: knowledge-based strategies in political cognition."
rnal of Experimental and Social Psychology, 1983, 19,
-400.

T. & Linville, P.W. "What does the schema concept buy
" Personality of Social Psychology Bulletin. 1980, 6,
-557.

,T., and Taylor, S.E. .Social cognition. Reading, Mass.:
son-Wesley Publishing Company, 1984.

T., Taylor, S.E., Etcoff, N.L., & Laufer, J.K.
ging. Empathy, and Causal Attribution." Journal of
rimental Social Psychology. 1979, 15, 356-377.

Deciding what's news. New York: Pantheon Books, 1979.

.. A. Processing the news. New York: Longman
ishing Company, 1984.

. "Schematic principles in human memory." In E.T.
ins. C.P. Herman & M.P. Zanna (Eds.), Social Cognition:
Ontario Symposium (Vol. 1), Hillsdale, N.J.:Erlbaum,
.

"Political schemas, candidate evaluations, and voting
vior." Unpublished manuscript. Paper presented at the
annual Carnegie Symposium on Cognition, Pittsburgh, May
0, 1984; and the 7th annual International Political
hology Association meeting, Toronto, June 17-20, 1984.
r available from Richard R. Lau, Department of Social
ces, Carnegie-Mellon University, Pittsburgh, Pa. 15213

W. Public opinion. New York: Macmillan, 1922.

"Self-Schemata and processing information about the
." Journal of Personality and Social Psychology. 1977,
3-74.

and Smith., J. "The influence of self-schema on the
ption of others." In N. Cantor and J. F. Kilhstrom
), Personality, Cognition, and Social Interaction.
dale. N.J.: Erlbaum, 1981.

R., & Bobrow, D.G. "On the role of active memory
eses in perception and cognition." in C. Cofer (Ed.),
tructure of Human Memory. San Francisco:Freeman, 1976.

, C. & Durao, F.T. "Effect of schema-incongruent
rmation on memory for stereotypical attributes." Journal
rsonality and Social Psychology. 1984, 47, 55-70.

Ostrom, T.M., Pryor, J.B., & Simpson, D.D. "The organiz
social information." In E. T. Higgins. C.P. Herman,
Zanna (Eds.), Social Cognition: The Ontario Symposi
(Vol. 1), Hillsdale, N.J.: Erlbaum, 1981.

Phillips, B., Sociological Research Methods: An Introduc
Homewood, IL: The Dorsey Press, 1985.

Reeves, B., Chaffee, S., & Tims, A. "Social Cognition
Communication Research." In M. Roloff & C. Berge
Social Cognition and Communication, Beverly Hill
1982.

Roenker, D.L., Thompson, C.P. & Brown, S.C. "Comparison
measures for the estimation of clustering in free r
Psychological Bulletin, 1971, 76, 45-48.

Rothbart, M., Evans M., & Fulero, S. "Recall for confi
events: Memory processes and the Maintenance of soc
stereotypes." Journal of Experimental Social Psycho
1979, 15, 343-355.

Schank, R.C., & Abelson, R.P. Scripts, plans, goals and
understanding. Hillsdale, N.J.: Erlbaum 1977.

Shuell, T.J. "Clustering and organization in free recall
Psychological Bulletin, 1969, 72, 353-374.

Simon J.L. & Burnstein, P. Basic Research Methods in Soc
Science (3rd Edition), New York: Random House, 1985

Snyder, M., & Cantor, N. "Testing hypotheses about other
The use of historical knowledge." Journal of Experi
Social Psychology 1978, 15, 330-342.

Taylor, S.E., & Fiske, S.T. "Getting inside the head:
Methodologies for process analysis." In J. Harvey, W
& R. Kidd (Eds.), New directions in attribution rese
(Vol. 3), Hillsdale, N.J.: Erlbaum, 1981.

Wicks, R.H. "Portrayal of political parties by the telev
broadcast media in single and dual-party political s
Comparing the Soviet Union to the United States." Pr
at the 36th Annual Convention of the International
Communication Association. Chicago, IL., May, 1986.
available from Robert H. Wicks. School of Journalism
College of Communication Arts. Michigan State
University, East Lansing, MI, 48824.

Zeller, R.A. & Carmines, E.G., Measurement in the
sciences." New York: Cambridge University Press, 198

39

40

43