

# Granularity Effect of Patient's Medication Compliance Moderated by Communicator

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## Granularity Effect of Patient's Medication Compliance Moderated by Communicator

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**Keywords:** Granularity, Communicator, Compliance, Specialist Doctor, Co-assistant Doctor.

**Abstract:** Information about the time to take medication to patients is very important to be considered by each hospital. Many hospital communicators in this study (specialist doctors or co-assistants) who provide information about the time to take medication using the word 3 times a day, so that there are often differences in perceptions received by patients that affect adherence to taking medication. The use of fine granularity (every 8 hours) is once thought to be more precise than coarse granularity (3 times a day). Objective: Analyze fundamentally (exploratory research) the effect of granularity on patient compliance with medication moderated by communicators. Method: The study was conducted by collecting quantitative data with a questionnaire distributed to 120 respondents. This data is analyzed using two ways ANOVA. Results: Information about the time to take medicine delivered by expert communicators using fine granularity every 8 hours once more increases the patient's need to take medication. The contribution of this study is so that specialists at the Hospital can use the word every 8 hours for the time to take medication to further improve the health of the Indonesian people.

### 1 INTRODUCTION

Lately, there are a lot of doctors in hospitals that provide information about the time to take medication to patients by using the word 3 times a day rather than the word every 8 hours. The use of the word 3 times a day often leads to differences in perceptions received by the patient and will lead to patient disobedience for taking medication. So that the effect of the medicine is not optimal or even cause excessive side effects. Therefore, the role of the communicator, namely the doctor in relation to the recipient of information, namely the patient, is an important thing that must be given attention to all of us, in order to provide information about the timing of taking the medicine more clearly. So that the welfare of the Indonesian community will be increased.

This issue was first placed from the context made by Grice's (1975), the logic of conversation, which provides a conceptual framework for understanding how recipients of information get substantially different conclusions that are equivalent to speech speakers.

It was first predicted and observed that the granularity effect of the communicator's quantitative speech influenced the recipient's confidence in the accuracy of the information. In study 1 conducted by Zhang and Schwarz (2012) states that consumers put a window of time around the time that will be fulfilled from a project by showing the fastest time and the longest time they think of the project to be completed. This time window resembles a shrinkage of the confidence interval with the granules of quantitative expression, where completion time is expressed as "1 year" coming with a window of 140 days, but this time window shrinks to 84 days and at the same time is presented as "52 weeks".

This effect seems to reflect that the recipient of the information draws pragmatic conclusions from the form of communicator speech, which is consistent with the Gricean logic of conversation. Thus, both granularity should only influence consumer conclusions under conditions where they can assume that the communicator is cooperative, that is, follow the Gricean norms in conducting conversation (Schwarz, 1996). Empirically this case occurs when the communicator is cooperative.

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This research is a replication of the Journal of Consumer Research Inc. entitled "How and Why 1 Year Differs from 365 Days: A Conversational Logic Analysis of Inferences from the Granularity of Quantitative Expressions" by Y. Charles Zhang and Norbert Schwarz "in 2012. Results from study 1 conducted by Zhang and Schwarz, recipients of information go beyond the literal meaning of communicator sayings and they are present to choose granularity in interpreting the approximate meaning of time. In accordance with predictions from Grice's (1975) Logic of Conversation, it can be concluded that when communicators express using fine granularity it turns out to have a higher level of precision than when communicators express using coarse granularity. It was first predicted and observed that the granularity effect of the communicator's quantitative speech influenced the recipient's confidence in the accuracy of the information. In study 1 conducted by Zhang and Schwarz (2012) states that consumers put a window of time around the time that will be fulfilled from a project by showing the fastest time and the longest time they think of the project to be completed. This time window resembles a shrinkage of the confidence interval with the granules of quantitative expression, where completion time is expressed as "1 year" coming with a window of 140 days, but this time window shrinks to 84 days and at the same time is presented as "52 weeks".

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precision than when communicators express using coarse granularity.

Based on the results of these studies, we will conduct a follow-up study of Study 1 conducted by Zhang and Schwarz (2012) regarding "Estimate of Precision" which explains that communicators who express with fine granularity are estimated to have a higher level of precision. When the doctor speaks to his patient in giving an explanation of the time to take the medication, the explanation for the medication is often heard three times a day. But there are also some doctors who provide an explanation of the time to take medicine every 8 hours. From the doctor's information about the time to take the medicine has different perceptions received by the patient. The information received by these patients is two different things where the effects of information provided when communication occurs between the doctor and the patient can affect the patient's adherence to taking medication. Besides that, communicators in this case specialist doctors or co-assistants have an important role in influencing patient compliance to take medication. The importance of explaining the time to take the medicine is very influential on the effectiveness of the medicine that will be felt by the patient, therefore researchers feel it is important to discuss this so that it can be used as a reference that each doctor should be able to provide more accurate information on taking medication so that the patient can obey him.

In this study, it was found that patient compliance with medication was strongly influenced by the information conveyed by the communicator, in this case, a specialist or co-assistant. Information conveyed in conversations between patients and specialist doctors or co-assistants regarding the time taken to take the medicine is in the form of fine granularity, which is 3 times a day and coarse granularity which is every 8 hours. This study will prove whether there is a difference between fine granularity and coarse granularity to patient compliance with medication? Is there an influence from patient compliance with medication that is moderated by a specialist or co-assistant?

## 2 THEORY

### 2.1 Customer Behavior

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According to Schiffman and Kanuk (2004), the notion of consumer behavior is the behavior shown by consumers in the search for purchases, use,

evaluation, and replacement of products and services that are expected to satisfy their needs. Many understandings of consumer behavior by experts, one of which is defined by Umar (2003), namely "consumer behavior is direct action in obtaining, consuming and spending products and services, including the decision process that precedes the action".

## 2.2 Health Communication

Health communication is the process of delivering health messages by communicators through certain channels or media to the communicant with the aim of encouraging human behavior to achieve prosperity as strength which leads to a healthy (mental) and social (status) condition. Health communication is narrower than human communication in general. Health communication is closely related to how individuals in society try to maintain their health, dealing with various issues related to health. In health communication, the focus includes specific health relationship transactions, including various factors that influence the transaction in question.

In the level of communication, health communication refers to areas such as national and world health programs, health promotion, and public health plans. In the context of small groups, health communication refers to areas such as meetings discussing treatment planning, staff reports, and medical team interactions. In the context of interpersonal, health communication is included in human communication which directly affects professionals and professionals with clients. Health Communication is seen as part of the relevant fields of science, the focus is more specific in terms of health services.

## 2.3 Granularity Effect

The above reasons imply that Gricean's consideration will influence the choice of communicators of granularity where they reveal quantitative information as well as conclusions of recipients of this choice. In general, quantitative communications provide more information when quantities are represented in the form of fine granularity rather than coarse forms. This is the clearest example, estimates show "\$ 5,000-\$ 6,000" or "\$ 1,000 - \$ 10,000," here, the choice of the width of the interval strengthens the communicator's confidence in the accuracy of his estimates. Not surprisingly, information recipients prefer narrow

intervals, which provide further information. In addition, they are willing to sacrifice formal accuracy to assess information. For example, when the actual value is \$ 22.5 billion, 80% of participants expect "\$ 18- \$ 20 billion" to exceed the estimates of "\$ 20- \$ 40," Although the last interval includes the correct value and the non-forming (Yaniv and Foster, 1995).

We assume that recipients are sensitive to the communicator's granularity choices and take them into account when they interpret communicators' sayings. Therefore, we predict (i) that recipients that the recipient of the information will see the time estimate more precisely if the information conveyed use fine granules rather than coarse granularity, produced (ii) in the estimation of narrow intervals. These effects should not be observed when recipients doubt that the speaker is a cooperative communicator. When many variables can damage the perception of recipients from cooperativeness communicators (Levinson, 1983 and Schwarz, 1996).

Finally, the pragmatic conclusions of consumers tend to have behavioral consequences. If the same estimates are expected to be more precise when delivered in fine-granularity units, (iv) consumers must be more confident that the products provided are promised when quantitative promises are expressed well rather than coarse units that influence their product choices (study 4). When we assume that this prediction of granularity applies to all quantity of expressions, this study tests them in the area of the estimated time. Consumer perception about time is an important element in many aspects of consumer habits, from planning. (Leclerc, Schmitt, and Dube, 1995. Ulkiimen, Thomas, and Morwitz, 2008) and menu (Kumar, Kalwani, and Dada, 1997) toward product service and evaluation (Mogilner, Aaker, and Pennington, 2008).

## 2.4 Compliance

Obedient means to like and obey orders or rules, and be disciplined. Compliance means obedience, submission to teachings or rules. Compliance is the level of behavior of patients who are directed towards the instructions given in any form of therapy that is determined either diet, exercise, treatment or keeping an appointment with a doctor (Stanley, 2007). Compliance is a change in behavior from behavior that does not adhere to behaviors that comply with regulations (Green in Notoatmodjo, 2003).

According to Tyler (2004), there are two basic perspectives in the sociology literature regarding compliance with the law, which are called instrumental and normative. The instinctual mental perspective assumes that the individual as a whole is driven by personal interests and responses to changes intangible, incentive, and penalties related to behavior. The normative perspective relates to what people perceive as moral and contrary to their personal interests (Saleh, 2004; Prabowo, 2008; Sulisty, 2010). In terms of delivering financial reports to the public, the instrumental perspective illustrates that the incentives obtained by the company when delivering its financial statements on time are the response of the public to the company itself, and vice versa. Whereas for the second perspective, an individual tends to comply with the provisions, in this case, the timeliness of financial reporting because it is considered as a normative commitment through morality and because the authoring authority of the provision dictates behavior to report its financial condition at the specified time (normative commitment through legitimacy) in this case is Bapepam.

### 3 RESEARCH METHOD

The thinking framework in this study described above can be seen in the picture below:

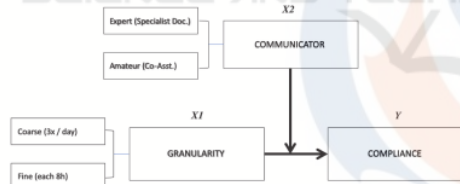


Figure 1: Thinking Framework.

Therefore to prove whether the patient is more obedient for the time to take the medication with coarse granularity (3 times a day) or fine granularity (every 8 hours) and has a higher level of precision when explained by a specialist than a co-assistant, the authors propose several hypotheses:

- H1: It is assumed that the level of patient compliance for taking medication using fine granularity (every 8 hours) is better than coarse granularity (3 times a day).
- H2: Alleged communicator expertise (specialist) modera- tes granularity and compliance.

This study uses the setting of medical services in a polyclinic at a General Hospital, with participants being male and female students. The criteria for study participants are school students aged 17-18 years. The study was conducted on high school students. The total number of participants needed is 120 people with details of 30 people for each group. To see the effect of fine granularity and coarse granularity on compliance, that is moderated by communicators, ANOVA is used as a data analysis tool in this research activity by comparing, so that it can find out the results of relevant research.

The type of data used in this study is qualitative data. The data needed are primary data, namely data obtained directly from the object of research in the form of responses, suggestions, criticisms, questions, and assessments of the object of research as respondents, explanations, and information on the results of direct observation. The data collection technique needed is to conduct surveys through field research (Field Research) by visiting directly to the object under study. The technique of data collection is done by questionnaire, namely a number of written questions that are used to obtain information from respondents.

In collecting data there are two types of data clustering that are often used in the process of grouping data namely hierarchical data clustering and non-hierarchical data clustering. K-means is one method of non-hierarchical clustering that seeks to divide existing data into clusters or groups so that data that has the same characteristics are grouped into one and the same cluster of data that has different characteristics grouped into other groups. This study uses non-hierarchical data clustering methods. To analyze the variables of the two concepts studied, they can be described in the instrument grid table as follows:

Table 1: Instrument Grid.

VARIABLES	DIMENSION	INDICATORS	SCALE
Granularity (X <sub>1</sub> )	Coarse Granularity	3 Times a Day	Category
	Fine Granularity	Each 8 hours	Category
(moderasi) (X <sub>2</sub> )	Specialist Doctor	Trusted to consult with	Category
	Co-Assistant Doctor	Untrusted to consult with	Category
Precision (Y)		Compliance to consume medicine	Category

Analysis of research is done by categorizing each participant's answer into a number symbol. For example, in the granularity variable, the group of "fine granularity" with the number "1", the group "coarse granularity" with the number "2". Whereas in the communicator variable, the group of specialist

doctors is coded with the number "1", the co-assistant with the number "2". After giving the code to each participant's answer, the researcher checks the answer to the manipulation check.

Participants who did not give the answer as expected in the manipulation check sheet were not included in the hypothesis test. In this study, descriptive analysis was used to describe the granularity profile in each group. This analysis is needed to test the uniformity (homogeneity) of the granularity profile in the group variable between-subject. Because the independent variables use categorical data, the dependent variable uses single continuous data and there are moderating variables, the analytical methods carried out in this study are two ways ANOVA.

Because independent variables use categorical data and dependent variables using single continuous data, in general, there is an analysis method carried out in this study, namely ANOVA which is an analytical technique that aims to test whether the average of more than one sample is significantly different or not, and test whether the sample has the same population variance or not, using the ANOVA model:

$$y_{ij} = \mu + \tau_i + \epsilon_{ij}, i = 1, 2, \dots, a \\ j = 1, 2, \dots, n_i \quad (1)$$

Inf.:

$y_{ij}$ : the value of the response variable in the

treatment for the  $j$ -th observation

$\tau_i$ : the effect of the second treatment

$\epsilon_{ij}$ : random error

$a$ : number of categories in treatment

$n_i$ : the number of observations in the  $i$  category

## 4 RESULT

SMAN 18 Tangerang Regency students have the character of teenagers in general. On average they come from disadvantaged families with a background of less-educated parents. The SMAN 18 school environment is good enough to shape the character of students to be better even though their home environment is less supportive. Cleanliness, good manners and discipline of students is quite good. The students who became the object of the study were 45 grade, 1 students of science 1, as many as 45 people, 40 Natural Sciences Classes as many as 40 people, IPS 1 grade students as many as 45 people and IPS 2 students as many as 38 people.

### 4.1 Hypothesis Test 1

Allegedly the level of patient compliance for taking medication using fine granularity (every 8 hours) is better than coarse granularity (3 times a day).

H1: test the hypothesis about the difference in mean Y deviation between each cell formed by the level of granularity factor. There is an average difference in the obstruction of compliance [Y] between each cell formed by granularity.

Table 2: General Linear Model ANOVA Test Result Tests of Between-Subjects Effects.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Nonscent. Parameter	Observed Power <sup>b</sup>
Corrected Model	177.958 <sup>a</sup>	3	59.319	27.911	.000	.419	83.734	1.000
Intercept	15847.008	1	15847.008	7456.407	.000	.985	7456.407	1.000
GRANULARITY * KOMUNIKATOR	174.283	2	87.142	41.002	.000	.414	82.005	1.000
GRANULARITY	3.675	1	3.675	1.729	.191	.015	1.729	.257
Error	246.533	116	2.125					
Total	16271.500	120						
Corrected Total	424.492	119						

a. R Squared = .419 (Adjusted R Squared = .404)

b. Computed using alpha = .05

c. Sumber : hasil olahan data spss 22

Based on the table above hypothesis 1 is not proven (rejected) because after testing it turns out the significance of granularity in the table is 0.191. These results are  $> 0.05$  which means if  $\text{Sig} > 0.05$ , then H1 is rejected.

### 4.2 Hypothesis Test 2

Presumably communicator expertise moderate's granularity and compliance. H2: Test the hypothesis for each  $\beta_2, \beta_3$ . The hypothesis can be either a one-party or two-party hypothesis. Especially for specialists [communicators = 2], the average deviation of compliance [Y] between the degree of fine granularity [fine = 1] is greater than the degree of coarse granularity [coarse = 2].

Table 3: General Linear Model ANOVA Test Result Parameter Estimates.

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval		Partial Eta Squared	Nonscent. Parameter	Observed Power <sup>b</sup>
					Lower Bound	Upper Bound			
Intercept	11.933	.266	44.535	.000	11.406	12.461	.945	44.535	1.000
GRANULARITY=1.001 * KOMUNIKATOR=1.001	-2.300	.376	-6.110	.000	-3.046	-1.554	.243	6.110	1.000
GRANULARITY=1.001 * KOMUNIKATOR=2.001	1.067	.376	2.834	.005	.321	1.812	.065	2.834	.802
GRANULARITY=2.001 * KOMUNIKATOR=1.001	-.533	.376	-1.417	.157	-1.279	.212	.017	1.417	.290
GRANULARITY=2.001 * KOMUNIKATOR=2.001	0 <sup>a</sup>	.	.	.	.	.	.	.	.
GRANULARITY=1.001	0 <sup>a</sup>	.	.	.	.	.	.	.	.
GRANULARITY=2.001	0 <sup>a</sup>	.	.	.	.	.	.	.	.

a. This parameter is set to zero because it is redundant.

b. Computed using alpha = .05

c. Sumber : hasil olahan data spss 22

Regression model equation:  
 $Y = \beta_0 - \beta_1 [\text{granularity} = 1] \times [\text{communicator} = 1] + \beta_2 [\text{granularity} = 1] \times [\text{communicator} = 2] - \beta_3 [\text{granularity} = 2] \times [\text{communicator} = 1] + \epsilon$  where value 1 = fine and coarse 2 = co-assistant. To test the hypothesis, it is necessary to prepare a table 'intercept' parameter  $\beta_i$

Table 4: Intercept parameter  $\beta_i$ .

	Co-Assistant	Specialist	Gap
Fine Granularity	$\beta_0 - \beta_1$	$\beta_0 + \beta_2$	$\beta_2 - \beta_1$
Course Granularity	$\beta_0 - \beta_3$	$\beta_0$	$-\beta_3$
Gap	$\beta_3 - \beta_1$	$\beta_2$	

The contents of each cell are an intercept so that the difference obtained is the difference in the intercept.

Table 5: Different in the intercept.

$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$
11.933	-2.300	1.067	-0,533

	Co-Assistant	Specialist	Gap
Fine Granularity	14.233	13	3.367
Course Granularity	12.466	11.933	-0.533
Gap	-1.767	1.067	

Based on the table 'intercept' parameter  $\beta_i$  show that the results of the special difference are  $\beta_2$ . Then it can be seen in the estimated parameter table of the  $\beta_2$  significance value is 0.005. These results are worth  $<0.05$ , which means that hypothesis 2 is proven (accepted).

## 5 DISCUSSION

In this study, after testing hypothesis 1, it was assumed that the level of patient adherence to taking medicines using fine granularity (every 8 hours) was greater than using coarse granularity (3 times a day) and the results of hypothesis 1 were not proven. The unproven cause of hypothesis 1 is that in testing hypothesis 1 the results are not significant. The possible causes of the results are not significant is the possibility caused by the respondents used in this study are high school students of grade 3 with an average age of 17-18 years, which when viewed from the age of those who still do not have sufficient knowledge and understanding that influence the answers from questionnaire distributed by researchers.

After testing hypotheses 2, the guess that the communicator's expertise moderated granularity and

compliance showed that the results of hypothesis 2 were proven. The proven cause of the hypothesis is that in testing hypothesis 2 the results are significant. The influence of an expert communicator in this matter is a specialist who provides information about drinking time using fine granularity which shows that patients will be more obedient. The reason for the patient's compliance may be that patients who go to a specialist have a serious illness and need to be treated correctly and precisely because of that the patient will be more obedient. Other causes of patient compliance for taking medication every 8 hours delivered by specialists are due to the high confidence and trust of patients to specialist doctors.

## 6 CONCLUSIONS

Based on the research conducted by Zhang and Schwarz (2012), the researchers are very interested in conducting more exploratory and fundamental research by conducting experimental research. First, pre-research is done by making 5 scenarios or story questions that tell about as if the respondent is sick and, in a hospital, and getting treatment by a specialist or co-assistant. From the five illustrations, the researchers asked 10 people to read and choose which scenario was good and make the reader as if they were in a situation created in the story scenario.

Then to ask about the time to take medicine for the dependent variable (compliance), 5 questions were made. Then the 5 questions are distributed to 5 people and ask which sentence is easily understood by the respondent. After getting the best results from the pre-study, the researchers made 4 booklets consisting of fine granularity groups with specialist doctors (booklet 1), the fine granularity with co-assistant (booklet 2), the coarse granularity with specialist doctors (booklet 3) and coarse granularity with co-assistant (booklet 4). After that, the researcher made 30 booklets for each booklet. So that the total of all booklets is for 120 respondents then distributed at the same time randomly or randomly to each respondent in this study who were respondents were students of SMAN 18 Tangerang Regency.

After each booklet was collected based on the group, then the data obtained was entered into excel. After data processing was performed using two ways ANOVA method, it was found that hypothesis 1 said that it was assumed that the level of patient compliance for taking medication using fine granularity (every 8 hours) greater than coarse granularity (3 times a day) was found not proven

because the results were not significant. So, hypothesis 1 is rejected.

Hypothesis 2 which states that alleged communicator expertise moderates granularity and compliance it turns out that after data analysis is found significant results so that hypothesis 2 is accepted. Based on the testing of hypothesis 2, it is seen specifically for groups that communicate with specialists with fine granularity patterns showing patients to be more obedient in taking medication compared to specialist communication patterns with coarse granularity. The authors conducted this study by using experimental studies. The data analysis with non-hierarchical clustering data using the K-means method is still very rarely used because there is no supporting theory.

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