# APPROACHES TO THE NORMAL LEVEL

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Central to the derivation of the P.A.S. formulation is the establishment of the Normal Level. The methods for computing Normal Level are as numerous and varied as the clinical interpretations which are generated from the formula itself. If there is anything definite which can be said about this concept, it is that very few who use the P.A.S. agree with others about just which mathematical process should be used to establish the value. Individual clinicians often experiment until they ultimately find one method which seems to work for them. Students learning the system are often taught, as a matter of fact, that Normal Level is derived precisely the way in which their teacher has demonstrated. Of course, they find out later that some thirty-odd other approaches could have been taken.

Beyond all of this, the most serious consideration in this regard is the matter of demonstrating the System's validity. Some very obvious methodological problems exist when different researchers attempt common definition from divergent approaches. Empericism aside, possibly the most frustrating aspect to this problem is John Gittinger himself, who accomplishes a frighteningly precise clinical interpretation of P.A.S. data based upon a Normal Level which he generates somewhere in his head!

The intention here, as a beginning, is to present the most commonly applied derivations. Where possible, some explanation is offered based upon various historical, and for the most part, unpublished information. Frankly, it has been difficult to establish many times, just who should be credited with having said what about Normal Level. Where applicable, apologies are offered. We will begin by entering Normal Level history in 1961, with the approaches described by Gittinger himself.

## The Atlas Formulations:

The Atlas formulations (Gittinger, 1961) are presented more for their historical significance than their present applicability. Gittinger provided a brief discussion of his thinking on the matter:

> "The Normal Level is a rough estimate of the potential intelligence level of a specific individual. It is called the Normal Level because it is the point at which the individual can be expected to achieve with normal effort and energy. It is not an Intelligence Quotient in the standard meaning because it is not subject to correction by chronological age.
>
> The basic hypothesis is that Normal Level is an inherent, innate, capacity subject to little change or modification by experience or training. There is no precise way for determining the Normal Level.

Experience with the test has suggested several methods for making an estimate that empirically appears to be reasonably valid. These methods will be described in detail below.

There is no single subtest which can be used alone for determining the Normal Level. Vocabulary, the subtest which has frequently been used for this purpose, is not stable enough for this purpose. In addition, in order to use the test cross-culturally, Vocabulary as a subtest is not included in the descriptive system at all. Digit Symbol is so variable and serves such a unique function in the descriptive system, (that) it is not used in the determination of Normal Level.

Specifically, Information, Comprehension, Digit Span, Arithmetic, Block Design, Similarities, Picture Arrangement, Picture Completion, and Object Assembly are potential factors in the determination of the Normal Level. Digit Span, Block Design, and Picture Arrangement have unique functions which limit their usefulness in determining the Normal Level, but they are a factor in the final determination. The six remaining subtests (I,C,S,A,PC, and OA) are the major subtests to be considered.

In many instances, a straight average of these six remaining subtests will provide a reasonably valid Normal Level. However, the tendency of individuals to overachieve and underachieve on specific tests as a result of experience and training frequently distorts the Normal Level estimate to the point of invalidity. The major assumption is that the majority of scores will tend to be close to the Normal Level. In some instances, the best method for determining the Normal Level may be through the determination of the modal score of the six subtests. This is particularly true when any of the tests tend to be unusually low or unusually high in relationship to others. In unusual records, particularly those derived from clinical populations and atypical groups, neither the average of the six subtests nor the modal score is sufficient. Consequently, a third method of estimating the Normal Level is to take the average of the three highest scores and use this average as an estimate of the Normal Level.

The methods used in this descriptive system, i.e., the Personality Assessment System, are comprised of a combination of three of these four above mentioned estimates and are as follows:

Interpretation of the personality characteristics is in every case dependent upon the placement of the Normal Level. Many adjustments satisfactory for one Normal Level group are not necessarily satisfactory in another group."

Step One: Record the scores of Digit Span, Block Design and Picture Arrangement.

Step Two: Record the 5 highest scores of the remaining six subtests (I,C,A,S,PC,OA) and take the arithmetic average.

Normal Level Estimate no. 1

Step Three: Take the arithmetic average of the 3 highest scores used in Step Two.

Normal Level Estimate no. 2

Step Four: Take the arithmetic average of the two Estimates (no. 1 & no. 2) and round off to the nearest whole number.

Normal Level Estimate no. 3

Step Five: From Step One, pick the highest single subtest score.

Normal Level Estimate no. 4

Step Six: Compare NLE no. 3 with the figure found in Step Five, NLE no. 4. If this figure is the same or within 1 point in either direction, use NLE no. 3 as the final Normal Level.

If NLE no. 4 is two points or more above NLE no. 3, add 1 point to the derived figure and use it as the final Normal Level.

If the NLE no. 4 is two points or more below NLE no. 3, make no change.

Normal Level Twenty-Nine:

Historically, probably the most extensively used computation is that which formally appears in Winne's summary of the System (Winne, 1966). Referred to as Normal Level 29, because it represented the twenty ninth attempt at operationally defining Normal Level, it is the contribution of David Saunders. N.L. 29, unlike others presented here, includes the Digit Symbol subtest of the Wechsler battery in the formulation. Its effect is to reduce the numerical N.L. estimate ultimately obtained. The justification for inclusion of the Digit Symbol (as well as a constant of 2) as a suppressor variable was statistically determined based upon a computer analysis by Saunders. Descriptively, it is related to the idea that Digit Symbol, a time-related task, in and of itself, has nothing to do with Normal Level per se. Other subtests though, which are also time-related, such as the Block Design and the Picture Arrangement, do figure into the computation. Thus, use of the Digit Symbol attempts to adjust for performances based upon time.* Also, N.L. 29 (like the N.L. 32 not presented here) is best used when studying larger groups or samples of data. It is less effective for individual profile analysis. The computation for N.L. 29 follows.

* This explanation is based upon a personal communication with David Saunders in March, 1983.

Step One: Obtain the weighted scores proper for the test given.

Step Two: Rank and list the 10 scores (excluding Vocabulary) from highest to lowest. Identify the 3rd, 4th, and 5th highest scores and the scores for Information, Similarities, and Digit Symbol.

Step Three: Multiply the 3rd highest test by 1, the 4th highest test by 6, and the 5th highest test by 2.

Step Four: Add to the result of Step Three, the scores obtained on the Information and Similarities tests.

Step Five: Subtract from the result of Step Four, the score of Digit Symbol and a constant of 2.

Step Six: Divide the result of Step Five by 10 and round up or down conventionally.

Normal Level Thirty-Two - B:

N.L. 32B is essentially an extension of N.L. 32 as published in the Monograph Supplement (Winne and Gittinger, 1973). Although somewhat cumbersome, by a series of adjustments it yields a Normal Level estimation which is much more appropriate for individual protocol analysis than either its parent formulation or N.L. 29. It further requires reference to a Normal Level Weights Table as found on pages 45 and 49 of the Monograph. The adjustments accomplish weights applied to the otherwise obtained scores for Block Design, Similarities, Picture Arrangement and Picture Completion based upon their relationship to the estimated Normal Level. A new weighted score is also obtained for Digit Span based upon digits forward and backward.

Step One: If the performance on Digits Forward and Digits Backward is known and the weighted score for Arithmetic is available, determine the WTS for Digit Span.

Digits Backward

| Digits Forward | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 7 | 8 | 9 | 10 | 12 | 13 | 14 | 16 | 17 | 19 |
| 9 | 5 | 7 | 8 | 9 | 10 | 12 | 14 | 15 | 17 | 18 |
| 8 | 4 | 5 | 7 | 8 | 9 | 11 | 13 | 15 | 16 | 18 |
| 7 | 2 | 4 | 5 | 7 | 9 | 10 | 12 | 14 | 16 | 17 |
| 6 | 0 | 2 | 4 | 6 | 8 | 10 | 11 | 13 | 15 | 17 |
| 5 | 0 | 0 | 3 | 5 | 7 | 9 | 11 | 12 | 14 | 16 |
| 4 | 0 | 0 | 1 | 4 | 6 | 8 | 10 | 12 | 13 | 16 |
| 3 | 0 | 0 | 1 | 2 | 5 | 7 | 9 | 11 | 13 | 14 |
| 2 | 0 | 0 | 1 | 2 | 3 | 6 | 8 | 10 | 12 | 13 |
| 1 | 0 | 0 | 1 | 2 | 3 | 4 | 7 | 9 | 10 | 12 |
| 0 | 0 | 0 | 1 | 2 | 3 | 4 | 5 | 7 | 9 | 10 |

Find the first approximation to WTS-D at the intersection of the row and column.

If D is greater than A, add 1 to the tabled entry.
If A minus D is equal to or greater than 2, subtract 1 from the tabled entry.

Step Two: Convert the weighted scores of the Wechsler battery to Normal Level Weights (NLW). Digit Symbol is not used in the determination of the Normal Level.

Step Three: Rank the four highest NLW from high to low, always putting primitive measure NLW at the top of any series of equal weights. If there are two or more equal primitive measures, the relative order of these is irrelevent.

Step Four: Observe the top three NLW:

a) If the first NLW is a primitive measure, go to Step Five.
b) If there are no primitive measures within the top three NLW, go to Step Seven.
c) In all other cases, go to Step Six.

Step Five: <u>The first NLW is a primitive measure</u>.

Add the first, second, and third NLW and then add 1 to the sum and go to Step Eight.

Step Six: There are primitive measure NLW within the top three NLW but the first NLW is not a primitive measure.

Add the second, third, and fourth NLW and add 1 to this sum and go to Step Eight.

Step Seven: No primitive measure within the top three NLW.

a) Add the second, third, and fourth NLW.
b) Subtract the fourth NLW from the second NLW.
c) If the fourth NLW is not a primitive measure, reduce this difference by 1; if the fourth NLW is a primitive measure, do not reduce the difference.
d) Add the result of Step 7c to the sum found in Step 7a.
e) Go to Step Eight.

Step Eight: Find the first approximation to Normal Level 32-B (See Table 6 in the Monograph Supplement no. 38)

Step Nine: Adjust this approximation by comparing it with the weighted scores.

If a new WTS for Digits has been calculated by Step One, use this WTS. Disregard the WTS for Digit Symbol in making the adjustments.

a) The approximation falls in Column A:
   1. If a primitive measure WTS and at least two other WTS are greater than the approximation, add 1 to the approximation to get NL 32-B. Go to Step Ten.
   2. If four WTS are greater than the approximation, add 1 to the approximation to get NL 32-B. Go to Step Ten.
   3. If neither of these conditions is met, the approximation becomes NL 32-B. Go to Step Ten.

b) The approximation falls in Column B:
   1. If a primitive measure WTS and at least two other WTS are greater than the approximation, add 1 to the approximation to get NL 32-B. Go to Step Ten.
   2. If four WTS are greater than the approximation, add 1 to the approximation to get NL 32-B. Go to Step Ten.
   3. If a primitive measure WTS and at least two other WTS are equal to or greater than the approximation, the approximation becomes NL 32-B. Go to Step Ten.

4. If four WTS are equal to or greater than the approximation, the approximation becomes NL 32-B. Go to Step Ten.
5. If none of these conditions are met, subtract 1 from the approximation to get NL 32-B. Go to Step Ten.

c) The approximation falls in Column C:

1. If a primitive measure WTS and at least two other WTS are equal to or greater than the approximation, the approximation becomes NL 32-B. Go to Step Ten.
2. If four WTS are equal to or greater than the approximation, the approximation becomes NL 32-B. Go to Step Ten.
3. If neither of these conditions is met, subtract 1 from the approximation to get NL 32-B. Go to Step Ten.

Step Ten: If Digit Span has been adjusted by Step One, go to Step Eleven. If Digit Span has not been adjusted, find the relationship between Normal Level and Digit Span.

a) NL < D: No adjustment required. Go to Step Eleven.

b) NL=D: If A-D > 2, increase A by 1 and decrease D by 2. If NL < 15, always interpret D as E-. Go to Step Eleven.

c) NL > D: If A-D ≥ 2, increase A and decrease D by 1 and go to Step Eleven.

If D-A = 2, increase D and decrease A by 1 and go to Step Eleven.

If D-A > 2, increase D by 2; make no change in A and go to Step Eleven.

(DESK ADJUSTMENTS)

Step Eleven: Find the relationship between Normal Level and Block Design.

a) NL < BD: If BD-S > 1, increase BD and decrease S by 1 and go to Step Twelve.

b) NL=BD: No adjustment required. Go to Step Twelve.

c) NL > BD: If BD-S > 1, increase BD and decrease S by 1 and go to Step Twelve

If S-BD > 2, make no change in S but decrease BD by 1 and go to Step Twelve.

Step Twelve: Find the relationship between Normal Level and Picture Arrangement:

a) NL<PA: If PA-PC>1, increase PA and decrease PC by 1 and go to Step Thirteen.

b) NL=PA: No adjustment required. Go to Step Thirteen.

c) NL>PA: If PC-PA>2, increase PC by 1 and decrease PA by 2. If NL 14, PA is always interpreted as U+, U, or U-. Go to Step Thirteen.

If PC-PA=2, increase PC and decrease PA by 1 and go to Step Thirteen.

If PA-PC=2, increase PA by 1; make no change in PC. Go to Step Thirteen.

If PA-PC>2, increase PA by 2; make no change in PC. In NL 14, always interpret PA as A+, A, or A-. Go to Step Thirteen.

Step Thirteen: Use the adjusted WTS to find the PAS formulation in a set of appropriate Normal Level conversion tables.

Normal Level Seventy-Six:

Normal Level 76, originally named NL 760530, was developed during April and May of 1976 by John Gittinger and John Winne and thus, came its name. It was designed as a replacement for Normal Level 32-B which involved some fairly elaborate "desk adjustments".

Normal Level 76 is designed to satisfy three conditions: 1) a duplication of NL 32-B, for most cases, by a simplified procedure; 2) a higher estimate of Normal Level for persons with two or three very low primitive scores; 3) retention of the differential weighing system of primitive measures and Object Assembly. Concerning the second condition put forward by Gittinger and Winne, the presumption is made that it is the most important of the three conditions offered by the authors of this Normal Level estimate. Considering that the very nature of an EFU primitive adjustment results in low scores, relative to Normal Level, on three of the nine subtests used in the calculation, Normal Level may be therefore underestimated for them. The converse may be true where primitive IRA adjustments are involved since those three primitive measures are, by nature, high. It should be noted that the formulation adjusts upward in order to better represent the EFU, however, it does not adjust downward.

For the purpose of Normal Level 76, the interpretation of Digit Span

is based upon Gittinger's original scheme for NL 32-B. A new score is arrived at by considering the relationship between Digits Forward and Digits Backward and then adjusting this value relative to the obtained score on the Arithmetic subtest. The formulations for the other subtests are slight modifications of the Normal Level tables as listed in the Monograph Supplement no. 38. The modifications attempt to eliminate major discontinuities and to provide a greater spread between extreme positions.

Normal Level 76 can be used for all forms of the Wechsler battery except for the WB 11 or the WPSSI, for which PAS is not appropriate. Since it is based upon the scaled scores, it assumes that all scores are available. Finally, it should be kept in mind that the determination of a new score for the Digit Span is not applied when scores are based upon test data from the WISC, WISC-R, or WAIS-R.

Step One: If the performance on Digits Forward, Digits Backward, and the scaled score for Arithmetic are known, obtain a new score for Digit Span. (See conversion table for NL 32-B)

Step Two: Eliminate the lowest scaled score. In cases of tied scores, the first choice for elimination is Object Assembly, and the last choice is a primitive measure.

Step Three: Add the remaining scores. Add 1 to this sum for each primitive measure included; Subtract 1 if Object Assembly is used.

Step Four: E = the Adjusted Sum/8, rounded conventionally. Reduce E by 1 unless a primitive measure and one other score equal or exceed E. Alternatively, reduce E by 1 unless three scores, not including a primitive, equal or exceed E.

Step Five:

NL = E + 3: If all primitive measures exceed E by 3 or more.

NL = E + 2: If two primitive measures exceed E by 3 or more or three nonprimitive measures exceed E by 3 or more.

NL = E + 1: If one primitive measure exceeds E by 2 or more and another primitive exceeds E by 1 or more.

OR

If three measures, including a primitive, exceed E and one of these exceeds E by 2 or more.

OR

If three nonprimitives exceed E and two of these exceed E by 2 or more.

NL = E: If none of these conditions are met.

Step Six: INCREASE NL by 2 if all primitives are less than NL by 3 or more.

INCREASE NL by 1 if two primitives are less than NL by 3 or more.

OTHERWISE: NL = NL.

Step Seven: Convert all scores, including Digit Symbol, into a PAS formulation by applying an appropriate Normal Level Table.

Normal Level Eighty-G

Appropriately named Normal Level 80-G because it was introduced by John Gittinger in 1980, this estimation is also most efficiently used against a set of slightly modified Normal Level tables. The modifications, too detailed to present here, are the changes proposed by Gittinger and Winne for use with NL 76.

The 80-G version of Normal Level is thought to be particularly useful for resolving the X,Y, and Z variables.* Essentially, these variables are used to reflect poor differentiation across the corresponding three primitive dimensions, much in the same way as "o's" are used to indicate incomplete compensation or modification.

Again, this estimation is a further attempt to streamline the mechanics of calculating Normal Level while at the same time making it more sensitive to certain personality idiosyncrasies characteristic of some adjustments.

Step One: If the performance on Digits Forward, Digits Backward, and the scaled score for Arithmetic are known, obtain a new score for Digit Span. (See conversion table for NL 32-B)

Step Two: Eliminate the lowest of the nine scaled scores. In cases of ties, the first choice for elimination is Object Assembly, and the last choice is a primitive measure.

Step Three: Add the remaining eight scores. Add 1 to this sum for each primitive measure included and Subtract 1 if Object Assembly is used.

* Personal communication with Robert MacLachlan, 1980, American International College.

Step Four: $E_1$ = Adjusted Sum/5, rounded conventionally.

Step Five: FIND $E_2$: Add 1 to $E_1$ if a primitive measure and one other test (or three tests, not including a primitive) exceeds $E_1$.

Step Six:
- $NL = E_2 + 3$: If three primitives exceed $E_2$ by 3 or more.
- $NL = E_2 + 2$: If two primitives exceed $E_2$ by 2 or more.
- $NL = E_2 + 2$: If three scaled scores exceed $E_2$ by 3 or more.
- $NL = E_2 + 1$: If two primitives exceed $E_2$ by 1.
- $NL = E_2 + 1$: If one primitive and two other scores exceed $E_2$ by 1 or more.
- $NL = E_2 + 1$: If three other measures exceed $E_2$, two of which are greater by 2 or more.

Step Seven: Maximum NL = 18 or the average, conventionally rounded, of the three highest scores, whichever is less.

It appears that the process of determining Normal Level began as a relatively simple arithmetic procedure, as presented in the Atlas Formulations, and quickly became fairly complicated. During the seventies, when for the first time the P.A.S. began to find some way into the more general psychological community, students were at least left with the impression that Normal Level was a very complex and perhaps vague concept to grasp. In fact, it is not complex, nor is it vague, nor mysterious. Beyond its mechanics, it requires the application of clinical intuition and skill which, like other assessment techniques, is experientially gained rather than classroom taught. All of the various proposals for estimating Normal Level are essentially attempts to objectify the intuitive process which Gittinger accomplishes in his head. Possibly the brief, straightforward approach reflected in Normal Level 80-G should be looked at not only in terms of its efficiency, but also as representing the perspective which Gittinger may have maintained over the years.

It is proposed here that whichever approach to Normal Level a clinician may choose, it should represent his first estimation of the value. P.A.S. analysis should not begin with the full formulation in hand but by "interpreting" Normal Level. Successive estimations, based upon an arithmetic approach, intuitive analysis of the data, and consideration of other known variables can lead to our final estimation.

References:

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