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"MIND CONTROL," "SYNTHETIC SANITY," "ARTIFICIAL COMPETENCE," AND GENUINE CONFUSION: LEGALLY RELEVANT EFFECTS OF ANTIPSYCHOTIC MEDICATION

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Several recent court decisions have granted committed mental patients statutory or constitutional rights to refuse unwanted treatment provided that the patient did not present dangers to himself or others.¹ Typically, the treatment in question has involved a class of drugs referred to as "antipsychotic medication." Although these cases have created a storm of controversy in both the medical and legal professions,² the debate has largely ignored an issue that plays

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a major role in the decisions themselves: the effect of antipsychotic drugs on the human mind.

As this article illustrates, many of the courts that have been confronted with the issue of a right to refuse treatment have constructed a profile of antipsychotic medications as "mind-altering" or "thought-controlling." In particular, they have viewed these medications as capable of inhibiting thought processes or changing the content of thought. Given the constitutional underpinnings of many of these decisions—the right to privacy or the right to freedom of speech—such conceptualizations may have materially affected the outcome of the courts' deliberations. One would assume, therefore, that the courts had substantial evidence on which to base their conclusions that the drugs were mind-altering or thought-controlling. As subsequently demonstrated, however, this assumption is fallacious.

This article examines various courts' conclusions concerning the effects of antipsychotic medications. After reviewing judicial approaches to these medications in several of the most significant right-to-refuse-treatment cases, the article analyzes a related line of decisions generally overlooked: namely, criminal cases concerning the effects of antipsychotic medications on both defendants' competency to stand trial and their proof of an insanity defense. Since the civil and criminal cases take rather different approaches to the presumably fact sensitive issue of the effects of antipsychotic drugs, the article undertakes a review of the psychiatric and psychological literature on the relevant effects of these medications on mentation (mental activity). Finally, the authors propose an empirically based model of the effects of antipsychotic medication that can be utilized as a foundation for resolving disputes about the use of antipsychotics in the

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variety of legal contexts where these problems abound. It is the authors' hope, therefore, to expose and clarify the factual inconsistencies in the courts' analysis of antipsychotic drugs and, thereby, to foster the knowledgeable consideration of the delicate constitutional questions addressed in these opinions.

To clarify subsequent discussion, some brief definitions are in order. Psychotropic drugs include any medications that affect mentation. Sedatives, tranquilizers, hypnotics, and antipsychotics are all subclasses of the psychotropes. Sedatives are medications that quiet, calm, or allay excitement without primarily reducing anxiety or inducing sleep. Tranquilizers decrease anxiety and agitation; if sedation results it is merely an unwanted side effect of their use. Hypnotics are medications administered to induce sleep. Antipsychotics (also called neuroleptics) reverse the symptoms of major mental illnesses (i.e., psychoses); their aim is the eventual restoration of normal mentation. Antipsychotics are often inaccurately referred to as “major tranquilizers.” While they may secondarily calm anxiety, that is not their primary influence on the mind. Used to an excess, however, they may act like simple sedatives. Since antipsychotic medications have been the nearly exclusive focus of litigation on the right to refuse treatment, this article extensively examines the conflicting judicial views of this subclass of psychotropic medications.

I. PERCEPTIONS OF ANTIPSYCHOTIC DRUGS IN COURT DECISIONS CONCERNING THE RIGHT OF PSYCHIATRIC PATIENTS TO REFUSE TREATMENT

Courts, in a variety of jurisdictions in the late 1970's and the early 1980's, have grappled with the controversial question of whether inpatients in psychiatric hospitals have a constitutional right to refuse medical treatment. The cases encompass a wide variety and detail of complex clinical and legal situations and issues. While an extensive analysis of the delicate constitutional issues involved in these cases is beyond the scope of this article, an in depth evaluation

4. Id. at 137.
5. See id. at 147.
6. Id. at 63.
7. See cases cited supra note 1.
8. See cases cited supra note 1.
of the courts’ perceptions of antipsychotic drugs is presented.

The earliest of these right-to-refuse-treatment cases, Goedecke v. State, was decided in 1979 by the Supreme Court of Colorado, sitting en banc. The court held that, under state law, a civilly committed inpatient possesses the right to refuse antipsychotic medication. Noting that the patient in question had been given Prolixin (a commonly used antipsychotic drug) involuntarily, the court concluded:

Prolixin had been selected to alter his psychotic thought patterns and to minimize his dangerousness.

Testimony at the hearing adduced that, aside from its behavior-modifying capacity, prolixin can generate such short-term side effects as stiffness, shakiness, restlessness and dizziness. Moreover, it was established that prolixin therapy can produce a long-term neurological condition called tardive dyskinesia. This condition initially causes involuntary tongue and lip movement. It may progress to involuntary movement of other muscles such as arm, shoulder and trunk muscles, and may cause permanent disability. Indeed, Goedecke's reason for refusing prolixin treatment was that he had previously been treated with the drug and had experienced some of its short-term adverse side effects, including passing out, falling down, loss of breath, stiff tongue, disordered thinking and a feeling like being “half dead.”

The decision, as demonstrated by this excerpt, focused on the deleterious short and long term side effects of the antipsychotic medication, without carefully considering the drug’s positive effects. The court determined that Prolixin had been selected to “alter his psychotic thought patterns,” but failed to recognize that this alteration was in the direction of normalcy. In addition, although the court was aware of the behavior-modifying capacity of the medication, it did not indicate that the behavior in question was, in fact, derived from the psychotic illness. Thus, the implication appears to be that other forms of behavior may have been affected as well.

10. Id. at 412, 603 P.2d at 124-25. By depending on a state statute to uphold the inpatient's right to refuse treatment, the court avoided the constitutional arguments. Id. at 411, 603 P.2d at 124.
11. Id. (emphasis added).
12. Id. The court did add that “[p]rolixin had been selected . . . to minimize [the patient's] dangerousness,” id., but did not explain that this may be achieved by alleviating the symptoms of his mental illness.
13. Id.
belief that antipsychotic medications can be used for sinister purposes of thought control, though not explicitly stated in the opinion, is implicit in the court's description of the effects of the drug.

Another 1979 case, *Rogers v. Okin*, probably the most influential right-to-refuse-treatment case to date, drew these conclusions in a more direct manner. The federal district court opinion in *Rogers*, in a section entitled “Anti-psychotic Drugs,” described these medications as follows:

Anti-psychotic drugs are chemical agents used to manage and treat serious mental illness. . . . In general, the drugs influence chemical transmissions to the brain, affecting both activatory and inhibitory functions. Because the drugs' purpose is to reduce the level of psychotic thinking, it is virtually undisputed that they are mind-altering.

Foremost among the possible side effects of anti-psychotic drugs is tardive dyskinesia. Tardive dyskinesia is a neurological side effect which may appear after prolonged use of anti-psychotic drug treatment. The disease [i.e., dyskinesia] is the outcome of a complex patient-drug interaction which is not currently well understood.\(^\text{16}\)

Additional attention was devoted to the short range effects of these medications.\(^\text{17}\)

In a later section entitled “The Involuntary Patient’s First Amendment Rights,” the opinion took the right-to-refuse-treatment issue in a novel direction, elaborating on its characterization of the medication as “mind-altering.”

It is clear from the evidence in this case that *psychotropic medication has the potential to affect and change a patient’s mood, attitude and capacity to think*. Such effects may well be considered by the medical profession as positive steps on the road to recovery and eventual release from the hospital. But, the validity of psychotropic


\(^{15}\) 478 F. Supp. at 1359.

\(^{16}\) Id. at 1360 (emphasis added). The court proceeded to list tardive dyskinesia’s symptomatology in extensive detail. *Id.*

\(^{17}\) See *id*. These short term effects included “akathisia (motor restlessness—the inability to sit still), akinesia (physical immobility and lack of spontaneity), dystonia (spasmodic muscle reaction frequently characterized by a twisting of the neck), and pseudoparkinsonian syndrome (mask-like face, rigidity of the hand).” *Id.*

\(^{18}\) *Id.* at 1366.
drugs as a reasonable course of medical treatment is not the core issue here. At stake is the more fundamental question as to whether the state may impose once again on the privacy of a person, already deprived of freedom through commitment, by forcibly injecting mind-altering drugs into his system in a non-emergency situation.

The right to produce a thought—or refuse to do so—is as important as the right protected in Roe v. Wade to give birth or abort. . . . Without the capacity to think, we merely exist, not function. Realistically, the capacity to think and decide is a fundamental element of freedom.

The First Amendment protects the communication of ideas. That protected right of communication presupposes a capacity to produce ideas. . . . Whatever powers the Constitution has granted our government, involuntary mind control is not one of them, absent extraordinary circumstances. The fact that mind control takes place in a mental institution in the form of medically sound treatment of mental disease is not, itself, an extraordinary circumstance warranting an unsanctioned intrusion on the integrity of a human being.\textsuperscript{19}

The implication of the court's reasoning is not only that the patient can have the content of his beliefs altered by psychotropic medication, not merely the psychotic structure of those beliefs, but also that his thought can be entirely suppressed. The court thereby offered a vision of medication different from that of many other right-to-refuse-treatment decisions.

On appeal, the First Circuit Court of Appeals avoided the first amendment argument by deciding the case on fourteenth amendment grounds.\textsuperscript{20} In reviewing the district court's discussion of the effects of the various medications, the First Circuit appropriately noted that the lower court had "focused extensively on the harmful side effects" revealed by the record.\textsuperscript{21} The circuit court correctly indicated that the record also showed that "in many situations, despite the risks of harmful side effects, the administration of drugs to an individual is clearly in his best interests because of the beneficial effects that the drugs can have, including the amelioration of the pa-

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\item \textit{Id.} at 1366-67 (emphasis added).
\item 634 F.2d 650, 653, 654 n.2 (1st Cir. 1980).
\item Id. at 660 (emphasis added). This phenomenon—courts emphasizing the adverse effects of the medications—may be related to the tendency of courts to be interested in harms, since harms and not benefits are traditionally litigated.
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Moreover, the court warned that the failure to medicate in such situations could produce deleterious results in and of itself, such as "the unnecessary and possibly irreversible continuation of [the patient's] illness." Thus, the court emphasized the crucial point—in the area of medication, inaction is itself a treatment decision and can, in fact, create more harmful effects than might result from the involuntary administration of the drugs. The issue of "mind-control" was never addressed by the circuit court. The Supreme Court granted certiorari and subsequently remanded the case to the First Circuit, where it now awaits resolution.

The district court’s opinion in Rogers was cited with approval in a 1980 Ohio federal district court case, Davis v. Hubbard, concerning the conditions at that state’s main facility for the criminally insane, Lima State Hospital. The court addressed several issues under the rubric of a right to treatment—ranging from staffing to room size—and recognized the patients’ right to refuse antipsychotic medications. These medications were discussed as follows:

The term psychotropic or “mood altering” drug describes several categories of major tranquilizers (also called antipsychotic or neuroleptic drugs), antianxiety drugs (minor tranquilizers), antidepressants, sedatives, (e.g., barbituates), and hypnotics. None of the psychotropic drugs cures mental illness, but each category of drugs serves a separate function, and each produces distinct side effects and risk associated with its usage.

It is interesting to note that the Davis court’s discussion of psychotropics, similar to the district court in Rogers, stressed the absence of their curative effects, focused primarily on their adverse side effects and minimized their mainly positive aspects. The court did, however, in one passage, attest to the benefits of the drugs as follows:

Though there appears to be no generally accepted theory that explains the biochemical manner in which the drugs work, the ben-

22. Id.
23. Id.
26. See id. at 938 & n.32. The court stressed, however, that this was not an unlimited right, but one which must be balanced against legitimate state interests. See id. at 934-38.
27. Id. at 927 (footnote omitted).
Official effects of antipsychotic drugs are on thought processes and
the brain's ability to sort out and integrate perceptions and mem-
ory. That is, they stabilize and blunt thought processes. For this
reason they are used most often in the treatment of schizophrenia
. . . . Though this Court is in no position to assess the claims that
have been averred as to the benefits of the drugs, it can at least be
said that psychotropic drugs are an effective method of treating
schizophrenic symptoms, and may thus enable patients to benefit
from other types of therapy. 28

Despite this apparently balanced assessment, the use of the
phrase, "stabilize and blunt thought processes," is indicative of the
court's ultimate miscomprehension of the drugs' true effects. Unlike
most decisions, however, the court can not be faulted with a com-
plete ignorance of medical works concerning psychotropics, as legal
support for its propositions were interspersed with citations to medi-
cal authorities. 29 The court further stated that:

Accepting as true the general effectiveness of psychotropic
drugs, it is nonetheless clear that they may not be helpful in every
case. Further, there is at present neither an accurate method of
predicting how a patient will react to a particular drug, . . . nor
any accepted criteria for deciding what drug within a particular
class and in what amount to prescribe. Most disturbing, however, is
that all antipsychotic drugs can cause side effects which are "as
varied and serious as any pharmaceuticals approved for clinical use
in the United States." 30

Although the Davis court offered a more balanced view of antipsy-
chotic medications than earlier cases, it should be observed that the
court engaged in an extensive discussion of the negative effects of the
drugs, while devoting far less attention to their positive effects. 31

After a lengthy analysis of the case law relating to civil liberties
and the right of privacy of one's own body, 32 the court reached the
implications of its earlier remarks: 33

Aside from a person's interest in "physical security" and in
making decisions about how his body will be used or abused, the

28. Id. (citations omitted).
29. Id.
30. Id. at 927-28 (citations omitted).
31. This disproportion will be brought out even more strikingly in a later case, In re
32. See Davis, 506 F. Supp. at 929-33.
33. See supra text accompanying note 27.
forced administration of psychotropic drugs implicates a person's interest in being able to think and to communicate freely. The notion that the State cannot punish or deprive a person because of his thought or beliefs has long been beyond dispute. "The fantasies of a drug addict are his own, and beyond the reach of the state. . . ."

Though it is at least arguable that "treatment" at LSH [the subject hospital] has on occasion been administered for no purpose other than to punish inmates for their thoughts, the inmates' principal interest affected in the present case arises not from the State's attempts to punish thoughts but its attempts to use treatment as a means of controlling thought, either by inhibiting an inmate's ability to think or by coercing acceptance of particular thoughts and beliefs. . . .

. . . Under this view, government action which directly affects the mental processes would be unconstitutional under the First Amendment.\textsuperscript{34}

Thus, as in the district court's opinion in Rogers,\textsuperscript{35} the effect of these medications is seen as changing, and hence controlling, an individual's thoughts in a manner similar to brainwashing or to "thought control" in an Orwellian sense. Relying on this misconception, the Davis court not surprisingly concluded that: "Given the significant invasion of fundamental interests\textsuperscript{36} that the forced use of psychotropic drugs represents, the risk of danger which the State has a legitimate interest in protecting against must be sufficiently grave and imminent to permit their coerced use."\textsuperscript{37} The court further stated that "[t]hese drugs quite often cause pain and serious, long term, if not permanent, side effects. They deaden the patient's ability to think and their forced administration is an affront to basic concepts of human dignity."\textsuperscript{38} Thus, the fallacious spectre of mind control permeated the opinion and formed the critical ground upon which the court based its constitutional analysis.

Another important decision, recognizing a qualified constitutional right to refuse treatment, is Rennie \textit{v.} Klein.\textsuperscript{39} In that case,
the court adopted and incorporated its findings of fact from an earlier related case:

"[W]hile psychotropic drug treatment had shown considerable success, recent studies had raised questions about the efficacy of using psychotropics in every case of mental illness." The court also concluded, from the record presently before it, that many patients could improve either without being treated with psychotropics or by taking smaller doses than traditionally administered.

The dangerous side effects the court gleaned from the record included tardive dyskinesia, cancer, and the inhibited "ability to learn social skills needed to fully recover from psychosis."

In apparently describing the function of psychotropic medications, the court found that "[t]he drugs are most useful in diffusing schizophrenic thought patterns during acute psychotic episodes." It is unclear what the court was trying to convey by its use of the term "diffusing." Arguably, this term may have been chosen for its pejorative connotations, as opposed to other language, which might have conveyed a more curative or normalizing effect of the medications.

Relying on Rennie, as well as other authorities, the Supreme Court of Oklahoma decided In re K.K.B. The court's initial statements about the patient's illness and its treatment are as follows:

K.K.B. is suffering from schizophrenia, the etiology of which is not known. There are no physical symptoms and no physical basis for schizophrenia. . . . It is the most likely disorder to be treated with psychotropic drugs, but the precise nature of the benefits of these drugs is as yet uncertain and the dangers the drugs seek to avoid are usually not great. Psychotropic drugs do not cure schizophrenia and patients rarely recover, but merely go into remission

42. Id.
43. Id. at 1299.
44. Id. at 1298.
which can also be spontaneous without the use of drugs.47

Thus, by citing to the allegedly minor dangers of schizophrenia, by emphasizing the absence of a cure for this illness, and by pointing to spontaneous remission—a regrettably rare event—as though it were an average expectable outcome, the court has substantially mini-
mized the seriousness of the patient’s illness. The court further
noted: “Unfortunately rather unpleasant primary and side effects
often accompany the use of psychotropic drugs which many people
would prefer to avoid even at the risk of continuing mental
disorder.”48

No mention is made of any empirical basis for this potentially
important conclusion concerning people’s preferences. This conclu-
sion may have been derived, however, from the negative effects asso-
ciated with these drugs. The corresponding footnote to the above
quotation is enlightening as to the court’s underlying reasoning:

Testimony at trial, judicial decisions and commentators point to
many rather toxic and severe primary and side effects accompa-
nying the use of psychotropic drugs such as: dysfunction of the cen-
tral nervous system called extra pyramidal symptoms; blurred vi-
sion, dry mouth and throat, constipation or diarrhea, palpitation,
skin rashes, low blood pressure, faintness, fatigue; also sometimes
permanent states such as akinesia, akathesia [sic] and tardive dys-
kinesia characterized by rhythmic, repetitive involuntary move-
ments of the tongue, face, mouth or jaw sometimes accompanied
by other bizarre muscular activity. Also they may be responsible
for a condition wherein white blood cells disappear called agranulo-
cytosis which is fatal in 30%, [sic] of the cases.49

It is interesting to note that the court again emphasized the negative
properties of psychotropics through an extensive list of side effects,
but ignored the potential that the medications have of reversing the
original symptoms of the illness.

Factually distinguishable from the foregoing cases is In re Roe,
III,50 a Massachusetts case, where the patient in question was an
outpatient rather than an involuntarily committed inpatient. The is-

48. Id. (footnote omitted).
49. Id. at 748 n.3 (citations omitted).
court held that, absent an emergency situation, only a judge, using a "substituted judgment" standard,1 could make such a decision.2

In its opinion, the Massachusetts Supreme Judicial Court offered several conceptualizations of the effects of antipsychotic medications. The most telling of these depictions was the court's initial definition of an antipsychotic drug: "[A] powerful, mind-altering drug which is accompanied by often severe and sometimes irreversible adverse side effects."3 Of particular interest in this threshold definition is the absence of any mention of beneficial effects, except possibly by inference from the ambiguous notion of "mind-altering."

The Roe court most closely addressed the question of medication in a section of its opinion entitled "The Decision to Administer Antipsychotic Drugs to the Ward."4 The court commented:

A single injection of Haldol, one of the antipsychotic drugs proposed in this case, can be effective for ten to fourteen days. [It is apparent to a specialist that the court has confused Haldol with Prolixin.] The drugs are powerful enough to immobilize mind and body. Because of both the profound effect that these drugs have on the thought processes of an individual and the well-established likelihood of severe and irreversible adverse side effects, . . . we treat these drugs in the same manner we would treat psychosurgery or electroconvulsive therapy. . . .5 While the actual physical invasion involved in the administration of these drugs amounts to no more than an injection, the impact of the chemicals upon the brain is sufficient to undermine the foundations of personality.6

The court proceeded to review the effects of medication with an extremely heavy and disproportionate emphasis on the negative effects. Extensive reference was made to a controversial law review article by Robert Plotkin,7 while citations to psychopharmacological

51. Under the "substituted judgment" standard, the judge must decide what the incompetent would choose to do if he or she were competent. See id. at 430-32, 436-40, 421 N.E.2d at 51-52, 56-59.
52. See id. at 442, 421 N.E.2d at 61.
53. Id. at 418, 421 N.E.2d at 42.
54. Id. at 428, 421 N.E.2d at 50.
55. The court here cited, inter alia, Plotkin, Limiting the Therapeutic Orgy: Mental Patients' Right to Refuse Treatment, 72 Nw. U.L. Rev. 461, 466-74 (1977); see also infra note 57.
57. Plotkin, supra note 55. While this article has been cited in a number of decisions on the right to refuse treatment, its influence appears disproportionate to the validity of its conclusions, which are drawn from a highly selective review of the psychopharmacological literature and which emphasize negative effects of medication in a distorted and inaccurate manner.
literature were relatively sparse.\textsuperscript{58}

The \textit{Roe} court acknowledged that antipsychotic drugs could "lessen the amount and intensity of psychotic thinking,"\textsuperscript{59} but, nevertheless, maintained that "among the most important reasons for their continued use is to control behavior,"\textsuperscript{60} citing Plotkin for authority. In addition to these "extreme intended" effects, the court also emphasized that the drugs have "frequently devastating and often irreversible" unintended effects.\textsuperscript{61} After quoting several pages from Plotkin's article, in which the author discusses the many adverse effects of antipsychotics,\textsuperscript{62} the court concluded that "[c]ommentators and courts have found that antipsychotic drugs are high-risk treatment."\textsuperscript{63}

Although the authors admit that the brief foregoing review does not adequately treat the complexity and detail of these varying opinions—encompassing as they do a wide variety of clinical and legal situations—it is, nevertheless, our hope that the quality and flavor of judicial portrayals of the effects of medication has been manifested. In particular, the most important features are the tendency of the courts to view the medications' adverse side effects as more prominent than their primary effects and to believe, apart from their normalizing influences on psychotic symptomatology, that these medications can negatively alter the manner in which people think.

Interestingly, these decisions on the right to refuse treatment ignore the large body of judicial decisions in the criminal law concerning the effect of antipsychotic medications. These latter cases present quite a different view of antipsychotic drugs.

\section*{II. Perceptions of Antipsychotic Drug Action in Criminal Cases}

In many of the cases that follow, a mentally ill defendant has been treated with antipsychotic drugs to enable him both to properly

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assist his attorney and to understand the proceedings against him. Often these defendants allege insanity as a defense—admitting that they committed the crime in question but claiming that they were legally "insane" during its commission. These defendants argue, therefore, that they are entitled to present their true demeanor and mental disposition before the jury and have a right to be tried unmedicated. A leading case often cited by defendants in support of their alleged right to be tried without state imposed medication is

64. The requisite two-pronged test which determines a defendant's competence to stand trial requires that the defendant have "sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding" and that he have "a rational as well as factual understanding of the proceedings against him." See, e.g., Drope v. Missouri, 420 U.S. 162, 170 n.7 (1975) (quoting Dusky v. United States, 362 U.S. 402 (1960)). This definition of competence to stand trial is not necessarily tantamount to a generalized nonlegal notion of mental competency.

65. Various courts have therefore acknowledged a right in defendants either to be tried in an unmedicated state, e.g., Commonwealth v. Louraine, 390 Mass. 28, 453 N.E.2d 437 (1983), or to inform the jury of the fact that the medication is being administered during trial, e.g., State v. Hayes, 118 N.H. 458, 389 A.2d 1379 (1978); In re Pray, 133 Vt. 253, 336 A.2d 174 (1975). Although it is not directly relevant to the main thesis of this article, the authors feel compelled to comment upon a flaw in the courts' reasoning in the cases allowing defendants to forego competency-restoring medication during trial.

The basic underlying premise relied on by the courts in this area is that a jury, which must decide whether a defendant was "insane" during the commission of the offense, could be influenced by how that defendant looks and acts in court during trial. See, e.g., In re Pray, 133 Vt. 253, 257-58, 336 A.2d 174, 177 (1975). Therefore, the medication given during trial, which is the sole means by which psychotic defendants are able to understand the proceedings against them, appears to be viewed as interfering with the jury's capacity to determine the defendants' sanity at a completely different time, i.e., when the offense was committed.

To illuminate the inherent flaw in this reasoning, however, let us assume that a psychotic individual commits a crime and then, during the long delay before trial, undergoes a spontaneous recovery, completely without the assistance of any medication. When the jury observes the defendant's trial demeanor (sometime after the crime), it is not seeing that individual in the same state as at the time of the crime. Yet, as in many other situations, the jury is expected to attempt to conceptualize the accused as he was at the time of the incident in order to assess whether he was then insane. In this scenario, the defendant clearly fails to resemble "who he was at the time of the crime," but nevertheless, the state of sanity at the time of the crime is the only issue.

This set of facts should be indistinguishable from the situation where the defendant's state of sanity during trial is achieved through the administration of antipsychotic drugs. Of course, in either circumstance, the jury would be required to evaluate the defendant's sanity at the time of the crime, which can be proved through evidence such as expert testimony. We do not question the courts' determination of the legal issues implicated by these facts, such as whether a defendant may be forced to be treated with medication during trial, or to what extent such treatment may inhibit a defendant's constitutional right to present evidence, see Commonwealth v. Louraine, 390 Mass. 28, 34-39, 453 N.E.2d 437, 441-44 (1983). Nonetheless, we believe that based on the factual issues involved, the more sensible resolution of the problem is to allow the state to administer proper medication to assist defendants in understanding the proceedings against them, while at the same time affording defendants the opportunity to inform juries fully as to the effects of the drugs.
Since the defendant in Maryott was treated with sedative medication, rather than with traditional antipsychotics, the case is considered here merely to show how and why other courts have distinguished it when analyzing the effects of antipsychotics.

In Maryott, the questions before the Washington Court of Appeals were whether the state had the right, over the defense counsel's objection, to administer drugs which affect the defendant's mental and/or physical ability at the time of trial; and particularly, whether the state may do so where the defendant's mental responsibility to commit the crime is at issue, i.e., the insanity defense. The court held that the state was prohibited from forcing the drugs upon the defendant in either situation.

During Maryott's trial, jail officials gave him substantial doses of Sparine, a very weak antipsychotic with primarily sedative qualities; Librium, a minor tranquilizer with no antipsychotic effect; and chloral hydrate, a sedative hypnotic. Expert testimony given before the appellate court indicated that "the dosages administered would affect the thought, expression, manner and content of the person using the drugs." In addition, at trial, the defendant was "observed to be sitting hunched over, staring vacantly ahead," unlike his usual self, and was, according to his lawyer, "suspicious and uncommunicative and refused to assist in his defense."

Although the defendant had a history of emotional illness, it is
not clear from the case precisely why he was given these drugs. It may reasonably be inferred from the court's opinion, however, that the medication was not administered to restore or enhance the defendant's competence to stand trial. First, in determining the defendant's competency, the court found that the evidence showed he was competent despite the medication. Second, in searching for a possible state interest for imposing the drugs upon an unwilling defendant, the court failed to mention competence restoration; rather, it presumed that the state's purpose was "to control a possibly obstreperous defendant." Given this possible state interest, the court held that the defendant had been denied due process by being forced to take the drugs. The court analogized to several old cases which held that defendants could not be chained or shackled in court because doing so would subject them to physical pain and thereby inhibit their mental faculties. The court applied this reasoning in the case before it, concluding that:

The application of the principles gleaned from the cases involving chaining and shackling to cases involving forced intake of drugs is, we believe, a difference only in degree and not in substance. To apply the historical concerns about shackling to cases involving drugs, which may have these same or more deleterious effects, is only to give a more current application to a basic concern.

When considering the effects of sedative medication, clinicians would have little quarrel with the basis of this reasoning, despite the extremism of the "drugs equal chains" comparison. The court's failure, however, to elucidate the distinction between competence-impairing sedatives and competence-restoring antipsychotics is demonstrated by the following passage of the opinion:

The court could at one time say with confidence, "Freedom to think is absolute of its own nature; the more tyrannical government is powerless to control the inward workings of the mind." Jones v. Opelika, 316 U.S. 584, 618 . . . (1942). The development of psychochemicals since that opinion in 1942 raises a question about the degree of assurance with which Mr. Justice Murphy

77. See id. at 105, 492 P.2d at 244.
78. Id. at 103, 492 P.2d at 243.
79. Id. at 100-01, 492 P.2d at 242.
80. Id. at 98-100, 492 P.2d at 241-42.
81. Id. at 100, 492 P.2d at 242.
The use of neologism "psychochemicals" invites confusion between sedatives apparently referred to here and antipsychotics. As will be illustrated in the cases that follow, this is an absolutely essential distinction.

In *State v. Hayes*, a defendant, whose competence to stand trial was dependent upon his being treated with antipsychotic drugs, claimed a right to be tried in his unmedicated state. The New Hampshire Supreme Court ruled that he lacked an absolute right to be tried free from the influence of drugs, distinguishing *Maryott* because:

*Maryott* apparently was based on evidence that the drugs there involved "would affect the thought, expression, manner and content of the person using the drugs. . . ."

In the case before us there is no evidence that the drugs administered to the defendant affected the process or contents of his thoughts. To the contrary, all the evidence indicates that the drugs used here allow the cognitive part of the defendant's brain, which has been altered by the mental disease, to come back into play. All the expert evidence supports the conclusion that the medication has a beneficial effect on the defendant's ability to function and that without the medication he is incompetent to stand trial. There is no evidence that the defendant's competence to stand trial can be maintained by less intrusive treatment techniques.

In *State v. Jojola*, the Court of Appeals of New Mexico was presented with precisely the same issue as in *Hayes*. The defendant, who had a long history of mental illness, was found to be psychotic, and to be suffering from a "schizophrenia of the paranoid type." The evidence showed that with the help of Thorazine, the defendant's condition was "in a state of remission." In particular, the "effect of Thorazine was described as inhibiting or depressing the emotional part of the brain and allowing the cognitive part to come back into play." In light of this evidence, the lower court found the

82. *Id.* at 98, 492 P.2d at 240-41 (emphasis added).
83. See cases discussed *infra* text and accompanying notes 84-103.
85. *Id.* at 462, 389 A.2d at 1381.
86. *Id.* at 461, 389 A.2d at 1381 (emphasis added).
87. 89 N.M. 489, 553 P.2d 1296 (Ct. App. 1976).
88. *Id.* at 491, 553 P.2d at 1298.
89. *Id.*
90. *Id.*
defendant competent to stand trial, contingent on the medication, and the defendant did not refute this finding on appeal.91

The defendant did contend, however, that he had "an absolute right to be tried free from the influence of Thorazine,"92 relying primarily on Maryott for support of his position.93 The court of appeals, however, rejected Maryott for the same reasons that Hayes did, finding that:

There is no evidence that Thorazine affected defendant’s thought processes or the content of defendant’s thoughts; the affirmative evidence is that Thorazine allows the cognitive part of the brain to come back into play. The expert witnesses declined to call Thorazine a mind altering drug. “Rather, Thorazine allows the mind to operate as it might were there not some organic or other type of illness affecting the mind.”94

Consistent with the decisions in both Hayes and Jojola is State v. Law,95 in which the defendant also claimed it was error to try him while he was under the influence of psychotropic medication. In Law, the defendant also cited Maryott,96 among other cases,97 for support of his contention that the medication inhibited his proof of an insanity defense.98

The Law court also found Maryott inapposite,99 declaring that “medication may be administered without the consent of a defendant . . . where the medication is necessary to render a defendant competent to stand trial.”100 Specifically addressing the issue of competency, the court concluded from the medical testimony that “the psychotropic medications administered to the appellant do depress and control the symptoms [of schizophrenia], thus calming the schizophrenic and allowing him to organize his thought processes and think more rationally. The medication brings on a state of remission by countering the psychotic effects of the active state.”101 The court

91. See id.
92. Id. at 492, 553 P.2d at 1299.
93. Id.
94. Id.
95. 270 S.C. 664, 244 S.E.2d 302 (1978).
96. Id. at 672, 244 S.E.2d at 306.
98. Law, 270 S.C. at 672, 244 S.E.2d at 306-07.
99. Id. at 672, 244 S.E.2d at 306.
100. Id. at 674, 244 S.E.2d at 307.
101. Id. at 670, 244 S.E.2d at 305.
The consensus of the medical testimony at both the competency hearing and trial indicated that the psychotropic medications had positive effects, reversing the active state and allowing [the appellant] to function in a more rational manner. While it is true the medications do affect cognitive and communicative processes, the effect is beneficial in that it enabled the appellant to effectively [assist counsel and confront the witnesses against him].

Thus, Hayes, Jojola, and Law all recognized the competency-restoring qualities of antipsychotic drugs and appropriately distinguished this medication from the sedatives used on the defendant in Maryott. In addition, various other courts have generally identified the capacity of antipsychotic medication to enable a defendant to understand the proceedings against him. In State v. Rand, for example, a mentally ill defendant being voluntarily treated with phenothiazine medication (the antipsychotics Stelazine and Thorazine), insisted that he was competent to be tried on outstanding murder charges. The court cited expert testimony confirming the stabilizing effect of the medication and ruled that the defendant was competent to stand trial under proper administration of the drugs.

This notion of competence contingent solely upon proper medication has been addressed in detail by several other courts under the rubric of "synthetic sanity." One such case is State v. Hamp-
ton involving a schizophrenic defendant treated with Thorazine to help restore her sanity. Evidence produced at the defendant’s competency hearing showed that “her psychotic symptoms were in remission,” as a result of the Thorazine treatment, but that “if the dosage were discontinued, she would probably relapse.” Although the defendant was deemed legally sane by two members of the “sanity commission,” the trial judge found that she was “only synthetically sane,” concluding that “trial capacity induced by medication was insufficient.” The judge, therefore, ruled that the defendant was “insane, or incompetent” and remanded her to a hospital.

On appeal, the Supreme Court of Louisiana astutely disagreed. The court ruled that the fact that the defendant’s psychotic symptoms were in remission as a result of prescribed medication was of “no legal consequence.” It reasoned that a court should look “to the condition only,” and should not “look beyond existing competency and erase improvement produced by medical science.” Hence, the higher court had no difficulty in grasping the notion of restored competence as valid competence, and in expressing it in a lucid and oft-cited way.

The concept of synthetic sanity was also addressed in Virgin Islands v. Crowe. The defendant in Crowe raised the question “of whether an accused whose mental capability can be maintained only through [Thorazine treatment] may nonetheless be deemed competent to stand trial.” The court answered this question in the affirmative, citing Hampton with approval. In addition, the court relied on expert testimony that the drug “would enhance the defen-

110. Id. at 401-02, 218 So. 2d at 311-12.
111. Id. at 402, 218 So. 2d at 311-12.
112. Id. at 401, 218 So. 2d at 311.
113. Id. at 402, 218 So. 2d at 312 (discussing the findings of the trial court).
114. Id.
115. Id. (noting the trial court’s ruling). The court considered the concepts of “sanity” and “competency to stand trial” as being equivalent, since the sole issue in the case was whether the defendant was competent to stand trial. See id. at 402, 218 So. 2d at 311.
116. Id. at 403, 218 So. 2d at 312.
117. Id.
118. Id.
121. Id. at 988.
122. See id. at 989.
EFFECTS OF ANTIPSYCHOTIC MEDICATION
dant’s ability to perceive the trial proceedings," and specifically noted that “thorazine is used primarily to suppress anxiety in the patient and thus effects [sic] the emotional rather than the cognitive processes of the individual.”

The cases discussed thus far in this section have generally demonstrated the willingness of courts in criminal cases to highlight the primary effects of antipsychotics and to give little or no attention to the alleged adverse secondary or mind-altering effects. In *United States ex rel. Bornholdt v. Ternullo*, however, the court specifically addressed the impact that certain physical side effects may have on a defendant’s competency during trial. In *Ternullo*, a convicted murderer challenged the constitutionality of his state conviction in federal court, claiming that he had been under the influence of medications during jury selection and, thus, was incompetent to stand trial.

The petitioner was diagnosed as “a remissive schizophrenic,” and was administered Prolixin “to counteract [his] extreme agitation and anxiety.” He was also given Artane, which the court noted, “caused side effects, such as excessive salivation, tremors of the

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123. *Id.*
124. *Id.* In addition to these cases dealing with “synthetic sanity,” *People v. De Anda*, 114 Cal. App. 3d 480, 170 Cal. Rptr. 830 (1980), cert. denied, 451 U.S. 990 (1981), brought forth the notion of “synthetic safety,” or, more properly, treatment-contingent “non-dangerousness”. The *De Anda* court determined whether a defendant had recovered his sanity sufficiently to forego state imposed temporary incarceration. It stated that:

- The trial court . . . found both that defendant had not recovered his sanity and that he was still a danger to himself or others. From the evidence presented it is apparent that defendant still needed antipsychotic medication and therapy and that he had not “fully recovered his sanity.” Without this medication and therapy there was a possibility that defendant could become dangerous. Since the purpose of commitment under section 1026 is “to protect the defendant and the public during the period necessary to appraise the defendant’s present sanity” . . . psychopharmaceutical restoration of sanity should not be considered a “full” recovery within the meaning of section 1026 . . . .

*Id.* at 490, 170 Cal. Rptr. at 835 (citation omitted). Thus, when the court concluded that this psychopharmaceutical restoration of sanity is not “full” sanity, it apparently meant that treatment-contingent non-dangerousness is not sufficiently reliable to suit the court so as to grant the defendant’s release. Given the seriousness of the crime with which the defendant was charged—assault with a deadly weapon—such a conclusion would find little objection from clinicians, experienced in varieties of noncompliance with treatment. Nevertheless, the court does appear to have confused the concepts of sanity and safety.

126. *See id.* at 376-77.
127. *Id.* at 375.
128. *Id.* at 376.
129. *Id.*
hands, a mask-like facial appearance, and a shuffling gait."\textsuperscript{130} The doctor who testified at the competency hearing "emphasized, however, that these drugs had no effect on petitioner's memory or cognitive faculties."\textsuperscript{131} This last remark, of course, demonstrates the numerous opportunities for misunderstanding in this area. The drugs were not given because they had no effect on the cognitive faculties; rather, the doctor obviously meant that they had no deleterious or impairing effect.

In any event, the federal district court did uphold the state trial court's finding of competency.\textsuperscript{132} The district court noted that, although the petitioner's attorney found his client's "concentration somewhat impaired during jury selection due to petitioner's preoccupation with his physical symptoms,"\textsuperscript{133} marked improvement was acknowledged as the proceedings progressed.\textsuperscript{134} Moreover, all of the evidence indicated to the court that "while the medication may have had some discomforting physical effects upon petitioner, it did not affect or impair his cognitive faculties."\textsuperscript{135} Thus, the court recognized that even physically visible side effects of the motor variety do not automatically vitiate a person's competent status.

Based on the foregoing brief review of cases,\textsuperscript{136} it can be observed that the courts in the criminal area: (1) have generally attested to the competence-restoring capacity of antipsychotic drugs; (2) have failed to cite so-called mind-altering effects; and (3) when actually analyzing physical side effects, have concluded that they have little impairment on normal mentation.

\textsuperscript{130} Id. Clinicians might quibble, however, that the court failed to address and to portray clearly the role of the anti-side-effect medication, Artane, whose only possible function would be to ameliorate the side effects of Prolixin.

\textsuperscript{131} Id. (emphasis added).

\textsuperscript{132} Id. at 377.

\textsuperscript{133} Id. at 376.

\textsuperscript{134} Id.

\textsuperscript{135} Id. at 377 (footnote omitted).

\textsuperscript{136} Although this review of cases concerning the effect of antipsychotic medication on competency to stand trial is representative of recent appellate decisions on the issue, it should be noted that some states may still bar defendants from standing trial when their continued competency is dependent on the administration of medication. As of 1976, some courts in at least 13 states still followed a version of the "automatic bar rule," which requires defendants to be free of medication at the time of trial. Appellate review of this practice has been infrequent but, as indicated in the review above, appellate courts have generally supported the use of psychotropic medication to restore patients' competency. See Winick, Psychotropic Medication and Competency to Stand Trial, 1977 AM. B. FOUND. RESEARCH J. 769, 772-75.
The criminal courts that have had an opportunity to consider the effects of antipsychotic drugs on mentation of defendants have often reached remarkably different conclusions than those civil courts that have addressed the right of psychiatric patients to refuse psychotropic medication. Whereas the former have often recognized a primary normalizing effect of the medications, the latter have frequently attributed to the drugs the capacity to affect adversely many of the most basic functions of the mind.

It is conceivable that the difference in the underlying subject matter before these courts may have led them to perceive the effects of psychotropics differently. In the criminal area, courts are generally suspicious of defendants attempting to avoid or overturn convictions on the basis of impaired competency (caused by the medications) at the time of trial. In contrast, in the civil area, courts are usually concerned about possible ill effects of forced treatment on hospitalized psychiatric patients. Yet, it is an inadequate justification of these divergent views merely to note that they support the probable biases of the reviewing courts. The same medications are at issue in each set of cases. Either their effects extend beyond the mere alleviation of psychotic symptoms or they do not. Either they adversely affect mentation or they do not. Courts should, at the very least, start their legal analysis, whether it be criminal or civil, on the basis of a common set of factual presumptions concerning psychotropics.

The authors are unaware of any review in either medical or legal literature that attempts to synthesize the diverse strands of research on the effects of antipsychotic drugs on mentation. Thus, the review that follows represents an initial effort in that direction and is designed to allow as definitive an answer as is currently possible to the question of the potential effects on mentation by these medications. It is hoped that courts in both criminal and civil cases will be able to base their future conclusions on this pool of data.

A. Effects of Antipsychotic Medications on Psychotic Symptomatology

Antipsychotic medications were initially introduced in the United States in the mid-1950's. The first of these medications, chlorpromazine (often known by its trade name, Thorazine), was a

137. See supra notes 84-124 and accompanying text.
138. See supra notes 9-63 and accompanying text.
member of the phenothiazine class of compounds, from which most other antipsychotic drugs have been derived.\textsuperscript{139} Other classes of medications, including the butyrophenones, thioxanthenes, dihydroindolones, and dibenzoazepines, were subsequently found to share similar clinical properties.

It is indisputable that these antipsychotic medications revolutionized the treatment of the severely mentally ill. For the first time, a treatment was available that directly eliminated many of the most prominent symptoms of psychotic illness. Early studies demonstrated that the drugs specifically reduced auditory hallucinations as well as other hallucinations, delusions,\textsuperscript{140} disordered thought processes, agitation, withdrawal, and other symptoms of psychotic illnesses such as schizophrenia.\textsuperscript{141} As of this date, a host of studies, far too numerous to be reviewed in detail here, have confirmed the utility of antipsychotic medications in psychotic mental disorders.\textsuperscript{142} Not only do the medications have an ameliorative effect on many clinically important symptoms, but when treatment has been successful, discontinuation of the medication will often lead to a relapse of the illness.\textsuperscript{143}

As a result of the introduction of chlorpromazine and related compounds, hospital treatment of severe mental disorders, particularly schizophrenia, has been dramatically altered. Control of the more florid manifestations of their illnesses has allowed patients to participate in rehabilitation and treatment programs designed to permit their release from institutional care.\textsuperscript{144} In 1955, the year following the introduction of chlorpromazine in this country, more than 558,000 patients were committed to state mental institutions. This figure represented the highest recorded number in recent history. By

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\textsuperscript{139} See generally R. BALDESSARINI, CHEMOTHERAPY IN PSYCHIATRY 12-56 (1977).
\textsuperscript{140} Delusions are fixed ideas not amenable to rational explanation. They are maintained against logical argument despite objective contradictory evidence. SUBCOMMITTEE OF THE COMMITTEE ON PUBLIC INFORMATION, AMERICAN PSYCHIATRIC ASSOCIATION, supra note 3, at 41.
\textsuperscript{141} See, e.g., The National Institute of Mental Health Psychopharmacology Service Center Collaborative Study Group, Phenothiazine Treatment in Acute Schizophrenia: Effectiveness, 10 ARCHIVES GEN. PSYCHIATRY 246 (1964); Goldberg, Klerman & Cole, Changes in Schizophrenic Psychopathology and Ward Behaviour as a Function of Phenothiazine Treatment, 111 BRIT. J. PSYCHIATRY 120 (1965).
\textsuperscript{142} See the studies referenced in D. KLEIN & J. DAVIS, supra note 71, at chapter 4 and in D. KLEIN, R. GITTELMAN, F. QUITKIN & A. RIFKIN, DIAGNOSIS AND DRUG TREATMENT OF PSYCHIATRIC DISORDERS: ADULTS AND CHILDREN 88-144 (2nd ed. 1980).
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1980, the number had fallen to just over 137,000 patients.\textsuperscript{145} Moreover, the average length of stay had been dramatically shortened, with the primary locus of psychiatric care shifting from state hospitals to acute, short-stay, general hospitals, in which psychiatric patients are housed in discrete psychiatric units or commingled with the regular medical and surgical population.\textsuperscript{146}

Despite the enormous impact of antipsychotic medications, it is clear that they do not represent a panacea for schizophrenia and other chronic psychotic illnesses. The medications suppress, but do not “cure” the illnesses in chronic patients and often leave residual symptoms, such as social withdrawal and idiosyncratic thought processes, untouched.\textsuperscript{147} Concern has also been expressed about the short and long term side effects of the medications, which is considered in more detail below.

The acknowledged normalizing effects of the antipsychotic medications, however, have not been the subject of much dispute in the cases concerning these drugs. Courts involved in right-to-refuse-treatment litigation and in criminal trials have not ordinarily questioned the efficacy of the medications in alleviating psychotic symptoms, although as noted above, some courts may have given these properties little emphasis.\textsuperscript{148} Instead, the controversies have often focused on the question of what additional effects these medications may have: whether they affect thought processes in a fashion that might be described as “mind control,” or whether they interfere with normal mentation so as to inhibit the ability of a defendant to function in his own defense.\textsuperscript{149} These effects on psychological processes have been the subject of a large number of investigations, but the authors are unaware of any previous effort to synthesize the disparate strands of data into a coherent assessment of the medications’ effects.

B. \textit{Effects of Antipsychotic Medication on Non-Psychopathological Aspects of Mentation}

1. \textit{Methodology}.—Before discussing the substance of our com-

\textsuperscript{148} See supra notes 28-31, 59 and accompanying text.
\textsuperscript{149} See supra notes 8-63, 84-135 and accompanying text.
pilation, some brief comments on our methodology are in order. The following review considers all known studies on the effects of antipsychotic medication on the mentation (apart from overt psychotic symptoms) of patients with psychotic illnesses. Studies of normal populations or of patients with non-psychotic diagnoses have been excluded from this review because the legitimate use of antipsychotic medications is almost entirely limited to patients with psychotic illnesses. Thus, the legal issues raised by their use are also peculiar to this particular group. In addition, the inclusion of non-psychotic populations in such studies would provide an unfair basis for testing these drugs, since absent the expected positive results, the only effects likely to be detected would be negative ones.

The studies reviewed below were generated by a search of the Index Medicus for all papers, written between 1970 and 1982, concerning the effects of medication on memory, learning, and cognition. The references in each of these papers were then researched, and a similar process was followed with the newly identified papers, until no additional, relevant studies could be found. Although a small number of studies may not have been detected by this search process, it is unlikely that any significant number, or any major studies, escaped our investigation. After the papers were collected, we excluded from our compilation those studies in which the populations

150. This is, however, a partial oversimplification. Antipsychotics may also be used to treat the behavior disorders of patients with significant mental retardation. See, e.g., Heistad, Zimmermann & Doebler, Long-Term Usefulness of Thioridazine for Institutionalized Mentally Retarded Patients, 87 AM. J. MENTAL DEFICIENCY 243 (1982). It is unclear if the action of these medications in retarded individuals resembles their action in non-retarded, psychotic patients, or if another effect is involved. It should be noted that this use of antipsychotic medications is controversial and that it has been alleged to cause precisely the sort of impairments in mentation that are the focus of this review. See Breuning, Ferguson, Davidson & Poling, Effects of Thioridazine on the Intellectual Performance of Mentally Retarded Drug Responders and Nonresponders, 40 ARCHIVES GEN. PSYCHIATRY 309 (1983). For reasons of manageability, however, this review will not include studies of the effect of antipsychotic medications on mentally retarded patients who are (at least arguably) non-psychotic. The conclusions below should not be generalized to that population without a similarly thorough review of a distinct body of literature.

Low doses of antipsychotics may also be used for the treatment of borderline personality disorders. Brinkley, Beitman & Friedel, Low-Dose Neuroleptic Regimens in the Treatment of Borderline Patients, 36 ARCHIVES GEN. PSYCHIATRY 319 (1979). Since the data reviewed below has been generated primarily from studies of schizophrenic and other grossly psychotic patients, it is similarly unclear if it can be generalized to this diagnostic group.

Antipsychotic medications have other uses as well; for example, in the treatment of Gilles de la Tourette's syndrome, although such use is relatively rare. See Shapiro, Shapiro & Wayne, Treatment of Tourette's Syndrome with Haloperidol, Review of 34 Cases, 28 ARCHIVES GEN. PSYCHIATRY 92 (1973).
EFFECTS OF ANTIPSYCHOTIC MEDICATION were not clearly labeled as psychotic or in which there was no true comparative design followed. The vast majority of studies which we did utilize examined the effects of chlorpromazine on patients who were diagnosed as schizophrenic. The papers in this review all analyzed one of the two following situations: (1) the performance of patients under at least two different conditions (i.e., drug versus no drug); or (2) the performances of two or more comparable groups of patients assigned to different conditions (i.e., antipsychotic versus placebo or other medication).

Although these procedures assure a measure of facial validity to the conclusions that follow, mention should be made of the inherent difficulties involved in drawing generalized conclusions from a review of these studies. Some studies considered the effects of medication on acutely ill patients, who might be expected to be more responsive to the beneficial effects of the medication, while others observed chronically ill patients, who might be more resistant to positive effects. If deleterious effects were present, they would thus be expected to be more prominent among chronic patients. There were also enormous differences in dosage, method, and frequency of administration of the medications. Dosages ranged from 25 to 1200 mg. of chlorpromazine, while usual clinical dosages vary between 200 to 800 mg. per day. Patients in some studies received medication only once, while others were treated for weeks or months before being tested. Beneficial effects of the medications are usually visible after a lag of a week to ten days; adverse effects, such as sedation, may be evident immediately, but may wear off with repeated administration. Single-dose studies, therefore, can be expected to show quite different (and probably more negative) results than studies using prolonged administration. Several investigators recognized that the effects of antipsychotic medications may endure for weeks or months after administration is halted and, therefore, provided "wash-out periods" of varying lengths for their subjects. Others ignored this problem and switched patients directly from drug to non-drug conditions.

The accuracy of diagnoses may also be an issue, especially in earlier studies. Schizophrenics are known to display a variety of relevant abnormalities of mentation as a result of their illness.\textsuperscript{151} Given

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that schizophrenia was often overdiagnosed in previous years in the United States, this may have led to non-homogeneous experimental populations. All of these problems may have compromised the validity of individual studies and, therefore, complicate the task of making comparisons across studies. Where these factors may have played a role in altering study findings, their presence will be noted below.

A final word of caution is needed about interpreting the findings to be presented. The presence of an adverse or beneficial effect of the medication as measured by the great variety of tests employed—even when the findings are regarded as "statistically significant" (i.e., unlikely to be due solely to chance variation)—either may not be relevant to a patient's everyday functioning in a way that is significant for the individual or may relate to functions that are only of value in the psychological laboratory. Few studies have paused to consider this important aspect of their findings.

The sections that follow represent a somewhat arbitrary grouping of the findings from these studies, since it is often difficult to identify with precision the functions being assessed by a given test. These sections do, however, have a practical use in providing at least a rough classification of a diverse group of studies.

2. Effects of Antipsychotic Drugs on Memory.—Four studies were found in which drug effects on memory were tested. Gardner et al. did the earliest work in this area. Their 1955 study compared nine chronic schizophrenics, who received moderate doses of chlorpromazine (up to 500 mg. per day) for an eight-week period, with ten patients on placebo. They found no difference between the two groups on the Graham-Kendall Memory-for-Designs Test. Later work tended to confirm this lack of effect of antipsychotic drugs on immediate memory, including a study by Daston of twenty-six schizophrenics, who failed to show significant changes in immediate memory, and a study by Pearl using four memory scales with
forty-eight chronic schizophrenics that had a similar result.\textsuperscript{156}

The only exception to this trend was in a study by Belmont et al.\textsuperscript{157} Comparing twelve probable acute schizophrenics on doses of chlorpromazine up to 1200 mg. per day with seven patients on placebo, the researchers found a significant increase in the ability to remember previous responses to a Rorschach test.\textsuperscript{158} On the other hand, on a memory-for-digits test, the medicated patients had a significant drop in their ability to recall digits. In sum, most investigators have found the medications to have no effect on memory, and the one conflicting study has internally inconsistent results.

3. Effects of Antipsychotic Drugs on Psychomotor Functioning.—A small number of experimental studies have indicated some impairment in the psychomotor functioning of patients treated with antipsychotic medication. Examining the acute administration of single 100 mg. and 200 mg. doses of chlorpromazine, Latz & Kornetsky found a significant decrease in the psychomotor output of eight chronic schizophrenic patients.\textsuperscript{159} This finding may represent the sedative effect of the medication, which usually disappears with repeated administration, a conclusion confirmed in another study by Kornetsky, Pettit et al.\textsuperscript{160} Thus, its relevance to the usual clinical setting is questionable.

Two 1957 studies by Porteus (which may have involved overlapping samples) showed a decrease in the performance on the Porteus maze test\textsuperscript{161} by chronic schizophrenics medicated for at least six

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\textsuperscript{156} Pearl, Phenothiazine Effects in Chronic Schizophrenia, 18 J. Clinical Psychology 86 (1962). In a fifth scale test, however, an adverse effect on complex motor skills was found, although intellectual functioning was not impaired. \textit{Id.} at 87-88.

\textsuperscript{157} Belmont, Pollack, Willner, Klein & Fink, The Effects of Imipramine and Chlorpromazine on Perceptual Analytic Ability, Perceptual Responsivity and Memory as Revealed in Rorschach Responses, 137 J. Nervous & Mental Disease 42 (1963).

\textsuperscript{158} See \textit{id.} at 47. The Rorschach test is the famous inkblot test in which subjects are shown a number of abstract blots and asked to comment on the images they perceive. Elaborate scoring methods have been developed for quantitative and qualitative aspects of patients’ responses.

\textsuperscript{159} Latz & Kornetsky, The Effects of Chlorpromazine and Secobarbital under Two Conditions of Reinforcement on the Performance of Chronic Schizophrenic Subjects, 7 Psychopharmacologia 77 (1965).

\textsuperscript{160} Kornetsky, Pettit, Wynne, & Evarts, A Comparison of the Psychological Effects of Acute and Chronic Administration of Chlorpromazine and Secobarbital (Quinalbarbital) in Schizophrenic Patients, 105 J. Mental Science 190, 195 (1959).

\textsuperscript{161} A graded series of mazes are presented to subjects in this test designed by the psychologist Porteus. Subjects are scored on various aspects of their accuracy in negotiating the maze. The test is said to measure planning and foresight, as well as intelligence, although psychomotor skills are also involved.
Arguably, this test reflects the planning and foresight of these schizophrenics as well as their psychomotor functions. The validity of these results is uncertain, however, because they failed to be replicated by two sets of later investigators. Daston found that there were no significant differences on a stylus maze test between eight chronic schizophrenics, medicated for fifteen days with 1200 mg. of chlorpromazine daily, and eight patients on placebo. Grygier & Waters had similar results with thirty chronic schizophrenic patients randomized to either 150 mg. of chlorpromazine or to placebo over twelve weeks. A consistent effect of the medications on maze performance thus remains unproven.

Of the remaining studies, almost all found antipsychotic medication to have no effect on psychomotor functioning: Heilizer observed no effect of chlorpromazine on finger dexterity, although consistency of responses increased; Tourlentes et al. could not detect an effect on motor speed; Whitehead & Thune reported no change in the ability to acquire motor skills; and Rosen et al. saw no change in body activity or scanning behavior. All of these studies were on schizophrenics who were mostly chronic and treated with antipsychotic drugs for at least several weeks. An additional study by Pearl found impairment on only one of five psychomotor tests, the Purdue Pegboard test. Clark et al., however, found an improve-

163. See Porteus & Barclay, supra note 162, at 298-99.
164. In this test, subjects are asked to trace their way through a maze using a stylus that is wired to record contact with the sides of the maze. Simultaneously, the stylus records the path taken through the maze on a sheet of paper placed under the apparatus. The goal is to make one's way through the maze as quickly as possible, without touching the sides and avoiding blind alleys.
171. See Pearl, supra note 156, at 87-88. The Purdue Pegboard test requires subjects to
ment on the Purdue Pegboard using a similar population of chronic patients as well as similar doses of medication.\textsuperscript{172}

Thus, most experimental studies in this area tend to show that antipsychotic medications have no effect on psychomotor function and those studies which do evidence some impairment have been uniformly contradicted by later efforts. It would be naive, however, to accept at face value this apparent lack of significant effect demonstrated in these studies. Whatever their usual effect on the capacities measured by these researchers, clinical experience—supported by a large body of literature—attests to the often dramatic effects of these medications on patients' motor functions.\textsuperscript{173} Within a decade of the introduction of chlorpromazine in this country, it was widely recognized that phenothiazines can have a substantial effect on the extrapyramidal motor system.\textsuperscript{174}

The most common acute motor side effects of the medications are parkinsonism, dystonia, dyskinesia, and akathisia.\textsuperscript{176} Drug induced parkinsonism resembles naturally occurring Parkinson's disease. Among the symptoms that may be induced are a resting tremor of the extremities, muscular rigidity, and hypokinesia (a decrease in spontaneous movement).\textsuperscript{176} Although parkinsonism usually has no effect on mentation, cases have been reported of severe hypokinesia (called akinesia) in which the decrease in spontaneous movement, speech, and display of emotion have induced reactive states of depression.\textsuperscript{177} These reports stress the necessity for differentiating these states from true depression or schizophrenic apathy and withdrawal. One reliable technique for making such a differentiation is available; severe akinesia with effects on mentation is nearly always accompa-
nied by overt sedation. All parkinsonian symptoms are usually responsive either to a reduction in dose of medication or to the addition of “anti-parkinsonian” medication, which counteracts the effects of the antipsychotics on the motor system without interfering with their beneficial effects on cognition.

Dystonias are acute and often painful spasms of muscle groups in the neck, back, face, eyes, or elsewhere in the body. They usually occur early in the course of treatment and especially in young males. Intravenous anti-parkinsonian medications can immediately alleviate dystonias, while maintenance doses of oral anti-parkinsonian drugs can prevent their recurrence.

Dyskinesias are involuntary, repetitive motor movements, such as flicking the tongue in and out of the mouth or complex movements of the fingers. They are ordinarily not painful and the patient may not even be aware of them. Dyskinesias also responds to anti-parkinsonian medications.

Akathisia differs from the other types of drug induced extrapyramidal symptoms because it is primarily an emotional state, characterized by a subjective need or desire to move. The most common symptom of akathisia is tapping of the feet or shifting of the legs—movements of which the patient may not be aware. Occasionally, however, akathisia can emerge as anxiety or tension that resembles psychogenically induced states. Akathisia can be confused with an exacerbation of psychosis or can, on occasion, lead to such an exacerbation. The most reliable means of diagnosis is to ask the patient whether he or she is experiencing a sense of inner restlessness. As with all of the other acute motor side effects of antipsychotic medications, akathisia can be controlled by reducing dosage or adding anti-parkinsonian medications.

A long term side effect that is often referred to in court decisions on the right to refuse treatment is tardive dyskinesia. Like

179. See Ayd, supra note 173, at 1054-55.
181. See id. at 45.
182. See id. at 44.
183. Id. at 44-45.
184. See id. at 45.
185. Id. at 46.
186. See supra notes 14-17, 39-43 and accompanying text.
EFFECTS OF ANTIPSYCHOTIC MEDICATION

Acute dyskineticias, tardive dyskineticias are involuntary movements of facial, arm, leg, or occasionally truncal musculature, but usually appear only after prolonged use of antipsychotic medications (months to years). Although the incidence of tardive dyskinesia is unclear, it has been estimated that 10 to 40% of patients receiving long term treatment may be affected. Usually overlooked by most courts are the facts that tardive dyskinesia is generally mild, not necessarily progressive and very often disappears if antipsychotic medication can be halted. Although severe cases may induce some subjective distress, it is not uncommon, as with acute dyskineticias, for patients to be completely unaware of their movements. Moreover, primary effects on mentation have not been reported. Thus, tardive dyskinesia is of limited relevance to the issue of the effects of antipsychotic drugs on mentation in general.

In summary, the foregoing review of studies examining the psychomotor effects of antipsychotic medication illustrates paradoxical results. While experimental studies fail to provide clear-cut evidence of more subtle negative effects, clinical studies document frequent, grosser abnormalities. Particularly important, however, are the findings that these acute side effects typically affect only the motor system and not mental functioning, are usually easily identifiable, and almost invariably respond to a lowering of antipsychotic dosage or the prescription of anti-parkinsonian medication. Although there are cases in which effects on mentation do occur (in akinesia and akathisia), if the etiologic role of the medication is not considered, the true cause of the symptoms may be overlooked. The frequency of these cases is unclear from the literature, but the authors' clinical experience suggests that failure to recognize medication as the cause of important psychomotor side effects that may affect mentation is probably uncommon.
4. Effects of Antipsychotic Drugs on Attention and Perception.—Since the distinction between the effects the drugs have on one's perception and their effects on one's attention is difficult to ascertain, they will be discussed in the same section. The most striking finding from a review of the relevant studies in this area is the diversity of results, with roughly equal numbers of studies showing impairment in function, improvement in function, or no change.

Two of the studies demonstrating some impairment in attention derive from Kornetsky's work with administration of single doses of chlorpromazine. Eight male, chronic schizophrenic patients showed significant decreases in sustained attention and increased response latency when given 100 or 200 mg. of chlorpromazine, compared with a placebo. An earlier study by this group had indicated impairment on two measures of sustained attention (pursuit rotor and tachistoscopic threshold tests) in chronic schizophrenics after chlorpromazine treatment, but the impairment was less than that sustained by a group of normal control subjects who received the medication.

Three studies of longer term administration of antipsychotics reached similar conclusions. Pearl found that thirty-two chronic schizophrenics, who received one of four phenothiazines for twelve weeks, had a significantly poorer performance on the Perceptual Span Test than sixteen similar patients on placebo. On the other hand, accuracy of perception of objects in the peripheral visual fields was unaffected. Allport et al. examined eight schizophrenic patients receiving an unspecified dose of chlorpromazine compared to eight on placebo for two weeks. No "wash-out" period was pro-

consideration of the possible causes of his symptoms will usually implicate the medication, if that is the cause of the syndrome. Nonmedical personnel, for example defense lawyers, could be taught to recognize likely signs of drug effects as well. Thus, although the effects are real, they are not ordinarily insidious or undetectable as suggested by the court decisions cited earlier.

192. Latz & Kornetsky, supra note 159, at 84-85.
193. Pursuit rotor test measures perceptual-motor abilities by asking subjects to attempt to maintain contact with a target that is on a moving turntable.
194. The tachistoscopic threshold test involves a tachistoscope which projects images on a screen for brief periods. The threshold test measures the minimum duration of projection at which stimuli can be identified.
195. Kornetsky, Pettit, Wynne & Evarts, supra note 160, at 195. Prolonged administration over two weeks, however, resulted in no impairment at all. Id.
196. As varying numbers of small circles are projected briefly on a screen in this test, subjects' accuracy of perception is measured.
197. See Pearl, supra note 156, at 88-89.
198. Allport, Crookes & Watt, The Effects of Reserpine and Chlorpromazine on Stimu-
vided to minimize the continuing effects of previous medication. The chlorpromazine group showed statistically non-significant increases in distractibility on two tests, an increase with no measure of significance on a third test, and no significant change on a fourth. The patients receiving chlorpromazine also had more difficulty maintaining an attentional set than the control patients.\(^{199}\)

Finally, Lloyd and Newbrough studied eighteen schizophrenic men—it is unclear if they were acutely or chronically ill—before and after twelve weeks of substantial doses of phenothiazines.\(^{200}\) This study is complicated by the fact that two of the medications used (i.e., Compazine and Pacatal) are now recognized to have no substantial antipsychotic effects. The group as a whole displayed significant decreases in several tests of perception and attention: critical flicker fusion frequency,\(^{201}\) auditory discrimination sensitivity, and kinesthetic aftereffects judgment.\(^{202}\) There was a non-significant trend to slowed reaction time and much greater variability on all tests after the medication.\(^{203}\)

In contrast to these findings, other investigators have noted improvements in attention and perception when the medications are administered. Saucer compared eighteen chronic schizophrenics who were receiving unspecified doses of chlorpromazine for at least one week with twenty patients who had not been treated for at least one month.\(^{204}\) The treated patients displayed a normalization of a defect in perception of apparent motion that appears to be consistently found in schizophrenics.\(^{205}\) Daston found an improvement in associative learning (a measure of concentrative attention span) in twenty-four chronic schizophrenic patients receiving chlorpromazine versus three other medications, as well as a placebo, in a cross-over de-
Orzack et al. used the Continuous Performance Test\textsuperscript{207} to measure the attention of eighteen chronic schizophrenics treated with carphenazine (a phenothiazine not currently in use) for twelve weeks.\textsuperscript{208} Patients showed significant improvement with the medications.\textsuperscript{209}

Other studies demonstrating improvement with medication included Magaro and Vojtisek's study of the performance of a mixed sample of schizophrenics on the Embedded Figures Test.\textsuperscript{210} The only significant effect was an improvement in the scores of the "poor prognosis" paranoid schizophrenic subsample. Phillipson et al., in a recent sophisticated study of nine acute schizophrenics examining the correlation between plasma levels of chlorpromazine and clinical improvement, found that non-hallucinatory perceptual disorders were the most sensitive of all symptoms to increasing plasma levels of the drug.\textsuperscript{211} Another recent, multifaceted study by Spohn et al. compared twenty chronic schizophrenics receiving chlorpromazine for eight weeks, in clinically appropriate dosages, with twenty similar patients receiving a placebo.\textsuperscript{212} This was one of the most sophisticated of the studies reviewed, utilizing an adequate "wash-out" period, random assignment, and double-blind procedures. Their findings indicated a decrease for the drug group in one measure of reaction time (ability to sustain a set to unpredictable stimuli), an improvement in vigilance, and a variety of improvements in perception, including: a reduction in overestimation and fixation time, in-

\textsuperscript{206} Daston, \textit{supra} note 155, at 107, 109.
\textsuperscript{207} The Continuous Performance Test is a method of studying sustained attention. The subject is required to fix his eyes on a visual display for long intervals and depress a key when particular stimuli appear. These stimuli appear for brief durations (0.1 and 0.2 seconds) at about the rate of one per second.
\textsuperscript{208} Orzack, Kornetsky & Freeman, \textit{The Effects of Daily Administration of Carphenazine on Attention in the Schizophrenic Patient}, 11 \textit{Psychopharmacologia (Berl.)} 31 (1967).
\textsuperscript{209} \textit{Id.} at 37.
\textsuperscript{210} Magaro & Vojtisek, \textit{Embedded Figures Performance of Schizophrenics as a Function of Chronicity, Premorbid Adjustment, Diagnosis, and Medication}, 77 \textit{J. Abnormal Psychology} 184 (1971). Subjects in the Embedded Figures Test are required to locate simple figures in complex designs organized so as to conceal the figure. The ability to perceive the figures ("field independence") is believed to correlate, among other things, with creative problem solving ability, but is also influenced by the ability to concentrate.
creased accuracy of perceptual judgments, and an increase in rapid recognition of visual stimuli.\textsuperscript{213} Abrams, in a separate study, also found a significant decrease in perceptual distortion in a chlorpromazine treated group of chronic schizophrenics compared with controls receiving a placebo.\textsuperscript{214}

Furthermore, a third set of studies indicated no effect on attention and perception as a result of antipsychotic medication. These included single dose studies that failed to show effects on reaction time\textsuperscript{216} or attention to competing voice messages.\textsuperscript{216} Also included were sustained dosage studies examining auditory acuity (arguably a measure of ability to attend),\textsuperscript{217} changes in recognition threshold of simple visual stimuli,\textsuperscript{218} and reaction time.\textsuperscript{219} It is interesting to note that this last study did find increased consistency in the medicated group.

Efforts to resolve inconsistencies between these three sets of studies are hampered by differences in methodologies, particularly the use of varying doses of medication and different measures of attention and perception. The most careful and extensive study, by Spohn et al., showed generally positive effects of medication,\textsuperscript{220} but there is too much conflicting data from other studies to accept that conclusion before a replication has been undertaken.

In summary, all that can be safely concluded is that effects on attention and perception have been neither proven nor disproven, although the better studies tend to show improvement. The conflicting results also suggest that if any effects exist, their magnitude is likely to be small.

5. Effects of Antipsychotic Drugs on Other Complex Functions.—A number of measurable psychological functions require the

\begin{itemize}
\item \textsuperscript{213} Id. at 634-35, 637-41.
\item \textsuperscript{214} See Abrams, Chlorpromazine in Treatment of Chronic Schizophrenia, 19 Diseases Nervous System 20, 27-28 (1958).
\item \textsuperscript{215} Wynne & Kornetsky, The Effects of Chlorpromazine and Secobarbital on the Reaction Times of Chronic Schizophrenics, 1 Psychopharmacologia 294 (1960).
\item \textsuperscript{216} Rappaport, Rogers, Reynolds & Weinmann, Comparative Ability of Normal and Chronic Schizophrenic Subjects to Attend to Competing Voice Messages: Effects of Method of Presentation, Message Load and Drugs, 143 J. Nervous & Mental Disease 16, 26 (1966). This may be due in part, however, to the low dosage given in testing.
\item \textsuperscript{218} Efron, Changes in Recognition Thresholds Associated with Chlorpromazine, Promazine and Phenobarbital, 15 J. Clinical Psychology 431, 433 (1959).
\item \textsuperscript{219} Heilizer, supra note 167, at 364.
\item \textsuperscript{220} See Spohn, Lacoursiere, Thompson & Coyne, supra note 212, at 633, 641, 643.
\end{itemize}
integrated operation of the mind. These functions, designated herein as "complex," are considered in this section. With few exceptions, the studies reviewed below reveal either drug related improvement in performance or the lack of an effect. Diminution in complex functioning as a result of medication is rarely shown.

Studies with positive results are discussed first. Like many studies, a report by Gardner et al. examined several subtests of the Wechsler-Bellevue Intelligence Scale (WBIS). The researchers found that nine chronic schizophrenics receiving 500 mg. of chlorpromazine for eight weeks did better than ten untreated control subjects on picture completion and similarities, but not on vocabulary subtests. Tests of significance were not used. Gilgash, using a similar design with twenty-two patients in each group, found a statistically significant comparative increase in full scale intelligence on the WBIS for his medicated group; highest gains tended to be on performance subtests. Abrams also found a significant increase in IQ, but both medication and control groups improved equally. The medication group, however, did significantly better on the similarities subtest, a test of logical thinking. The other study that confirmed a significant increase in IQ on the WBIS was performed by Castner et al. who found the greatest improvement on the performance subscales.

Another common measurement device was the Rorschach projective test. Nickols found a significant increase in spontaneity in a group of chronic schizophrenics receiving chlorpromazine, but not in a control group. Belmont et al., comparing twelve patients on chlorpromazine with seven controls, indicated an increase in perceptual responsiveness for their medicated group, as measured by the

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221. The WBIS is an early version of a standard IQ test that compares subjects' responses on a large number of questions to standardized norms. The test has a number of subsections that measure both verbal and performance skills. It is a forerunner of the Wechsler Adult Intelligence Scale, now in common use.


224. See Abrams, supra note 214, at 28.


226. See supra note 158.

227. Nickols, A Controlled Exploratory Investigation into the Effects of Thorazine upon Mental Test Scores of Chronic Hospitalized Schizophrenics, 8 PSYCHOLOGICAL REC. 67, 72-73, 75 (1958).
variety of responses on the Rorschach.228 Perceptual analytic ability, derived from the percentage of well-analyzed responses, did not change. Saretsky noted an improvement in “mean defense effectiveness,” the ability to deal with bizarre material, in schizophrenic patients receiving chlorpromazine for three months.229 The production of bizarre material, however, was unaltered.

A wide variety of other positive findings with antipsychotics have been reported by the following: Porteous, in mental confusion and speech order with chlorpromazine treatment;230 Abrams231 and Meadow et al., in conceptual disorganization;232 Clark et al., in errors on the digit symbol subtest of the Wechsler Adult Intelligence Scale;233 Phillipson et al., in overinclusive thinking;234 and Braff and Saccuzzo, in delays of information processing.235 A collaborative study sponsored by the National Institute of Mental Health indicated improvements in confusion, disorientation, and incoherent speech.236 Whitehead and Thune found significantly better performance on verbalized social adaptations with chlorpromazine and an improvement in the number of patients who could tolerate testing.237 There were no differences in problem solving or serial verbal learning.238

Phenothiazines have been shown to reduce errors of excessive breadth of concepts in twenty-four chronic schizophrenics, but also to increase random errors, while not affecting errors of excessively narrow interpretations.239 Medication has also been found to increase

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234. Phillipson, Baker & Williams, Change in “Overinclusive” Thinking of Schizophrenic Patients is Related to Plasma Phenothiazine Concentration, 24 ADVANCES BIOCHEMICAL PSYCHOPHARMACOLOGY 591 (1980).
236. The National Institute of Mental Health Psychopharmacology Service Center Collaborative Study Group, supra note 141, at 252-55, 259-60.
237. Whitehead & Thune, supra note 169, at 381, 383.
238. Id. at 381.
laughing, smiling, and social interactions. In a study by Hymowitz and Spohn, twenty-two chronic schizophrenic patients were tested three weeks after antipsychotic medication was stopped, and were compared to an equal group that continued to receive the medications. The study indicated that the “[m]edicated patients were more verbally communicative and showed an increase in the complexity and coherence of their speech and a decrease in pathological utterances.”

Findings that antipsychotic medications have no effect on complex functions are more uncommon than those findings of positive effects discussed above. Nickols saw no effect of chlorpromazine on the WBIS or the Arthur Point Stencil Designs Test; Castner et al. found no consistent changes on the Rorschach test; Pearl indicated no changes on several Wechsler Adult Intelligence Scale subtests; Grygier and Waters found no change in tests of vocabulary or information; Tourlentes et al. could detect no alterations in several measures of communication ability (verbal and non-verbal intellectual functioning, fluency, speed of recognition, and suggestibility); and Spohn et al. saw no effect on measures of abstraction and autistic and overinclusive thinking, although there was a trend towards improvement in cognitive functioning on clinical measures.

A few studies have demonstrated negative effects of antipsychotic medications on complex cognitive functions. Latz and Kornetsky, again using single doses, reported a decrease in cognitive-associative functioning in eight schizophrenics. Examining the complexity of sentence structure, Goldman-Eisler et al. found that 25 mg. of intravenous chlorpromazine, given as a single dose, produced a fall-off in complexity in two schizophrenic patients. This

240. Rosen, Tureff, Daruna, Johnson, Lyons & Davis, supra note 170, at 382.
242. Id. at 287.
243. Nickols, supra note 227, at 75. The Arthur Point Stencil Designs Test requires subjects to superimpose two or more of 18 cards in order to match a pattern presented by the tester.
244. See Castner, Covington & Nickols, supra note 225, at 26.
245. See Pearl, supra note 156, at 87.
246. Grygier & Waters, supra note 166, at 702.
249. Lantz & Kornetsky, supra note 159, at 84.
finding, however, may be related to the sedation produced by this highly unusual mode of administration. Finally, Rosen et al. examined the frequency of social interactions in newly admitted, psychotic patients.\textsuperscript{251} Comparing seventeen patients who were medicated with antipsychotics shortly after admission with twenty-four subjects who were kept medication-free for two to three weeks, they found that the medication tended to produce a transient decrease in social interaction frequency, which returned to normal after three to four weeks.\textsuperscript{252}

Studies of complex functions in psychotic patients indicate overwhelmingly that antipsychotic medications improve functioning on a variety of measures. This observation might be expected from the previously described efficacy of these medications in alleviating clinical symptomatology, since the effects of psychosis are likely to be greatest on capacities that require an integration of higher functions.

IV. A SUGGESTED APPROACH TO THE LEGALLY RELEVANT EFFECTS OF ANTIPSYCHOTIC MEDICATIONS

Since the foregoing review of the relevant studies and reports has been completed, it is now appropriate to synthesize the presented data into a comprehensive and empirically valid view of the effects of antipsychotic drugs. It should first be noted, however, that the need for such an overview transcends the questions of a right to refuse treatment or the effects of antipsychotic medications on defendants' performance at trial. Medication effects on mentation may raise important issues in a wide variety of legal contexts, for example: challenges to a person's contractual or testamentary capacity;\textsuperscript{253} assessments of the acceptability of defendants' waiver of their constitutional rights;\textsuperscript{254} or determinations of the need for the appointment of a guardian.\textsuperscript{255} In fact, whenever the courts are confronted with

\begin{footnotes}
\item[251.] Rosen, Tureff, Daruna, Johnson, Lyons & Davis, \textit{supra} note 170, at 379.
\item[252.] \textit{Id.} at 381-84.
\item[253.] \textit{Cf.} Powell v. Weld, 410 Ill. 198, 101 N.E.2d 581 (1951) (testamentary capacity necessary to execute a valid will is defined as sound mind and memory, as reflected by factors such as: sufficient mental capacity to understand the nature of one's property, the ability to transact ordinary business, and the ability to know one's relatives).
\item[254.] In order for such a waiver to be legally valid, it must be made knowingly, intelligently, and voluntarily by the defendant. \textit{See} Johnson v. Zerbst, 304 U.S. 458 (1938). Such rights include, for example, the right to refuse consent to search, right to Miranda warnings, and right to effective counsel.
\item[255.] \textit{Cf.} Long v. Campion, 250 Minn. 196, 84 N.W.2d 686 (1957) (one who, because of physical or mental incompetence, is adjudged incapable of managing his own property may
the need to determine the actual or potential functioning of an individual who is receiving antipsychotic medication, some assumptions concerning the nature of medication effects will inevitably enter into the decision.

It seems fair to conclude that courts should have no hesitancy in acknowledging the demonstrated efficacy of antipsychotic medications in alleviating the symptoms of psychosis and in preventing their recurrence. These normalizing effects have been indicated in a multitude of studies. Psychotic symptoms, such as disordered thinking, agitation, and hallucinations, have been found to be suppressed or eliminated, thereby facilitating the re-emergence of normal patterns of cognition. Even when the medications fail to resolve completely the symptoms of psychotic illness, their effect is to alter mental functioning in the direction of normality. Although a patient's remission induced by medication may be dependent on the continued administration of drugs, the resulting cognition and behavior should not be considered "synthetic" in the sense that it is detectably different from the patient's functioning in the natural absence of a psychotic illness.

Assuming that the primary effect of antipsychotic medications on psychotic symptoms is indeed a normalizing one, the question remains whether secondary effects of the drugs might impair other aspects of mental functioning. Based on existing data, with one exception to be addressed below, such a mental impairment seems highly unlikely. The few studies of the effects of antipsychotic drugs on memory generally indicated that there was no adverse impact. Although further, more detailed investigations might be of interest, there is at present no reason to believe that they would yield different results. Experimental studies of effects on psychomotor functioning similarly failed, in general, to demonstrate deleterious effects of the medication. Although the studies reviewed that focused on diverse aspects of attention and perception had more mixed results, the better and more recent studies indicated a beneficial effect of the medications in this area. Nonetheless, this is a subject about which further inquiry, particularly if performed at the level of sophistication of Spohn et al., might be most useful. Finally, empirical studies of antipsychotic drug effects on complex cognitive functions—those capabilities most likely to be of relevance to the legal
issues outlined above—overwhelmingly show a positive effect of the medications.

Yet, as previously discussed, these studies do have their limitations. They certainly cannot be generalized to non-psychotic or normal populations, though it is difficult to imagine any legitimate circumstances in which a normal individual would be treated with antipsychotic drugs.258 Available evidence suggests, however, that psychotic medications lack the subtle, deleterious effects on mental functioning attributed to them by several of the opinions on mental patients' right to refuse treatment.259 The experimental data cannot be interpreted as being consistent with a view of these drugs as mind-altering, thought-inhibiting, or destructive of personality in a negative sense. In fact, the beneficial effects of the medication on complex aspects of mentation suggest that the opposite conclusion is true: the medications reinforce the most important aspects of mental functioning.

As noted previously, an important caveat must be mentioned here. It is clear from the clinical literature that two of the side effects of antipsychotic medication on the motor system have the potential of affecting mentation adversely. Akinesia is sometimes accompanied by states of reactive depression and akathisia may be characterized by subjective emotional distress.260 Yet fears of “mind control,” even in these two situations, are still unwarranted. Many medications, when not monitored carefully, have the potential to induce side effects that affect mental functioning.261 The proper response when any such effects appear is to consider the medication as a possible causative agent and to take appropriate measures to alleviate the symptoms. In most cases, this will mean a modification of the dosage or a discontinuation of the medication.

The situation differs for antipsychotic medications only in that many psychiatrists and other physicians were, for a long time, unaware of the potential for these medications to induce such effects. Most of the time, however, there is nothing subtle about the presen-
tation of the patient's symptoms and a well-trained psychiatrist should suspect the etiologic role of medication. An injection of intravenous anti-parkinsonian medication will usually provide an immediate answer to the question of whether medication induced akinesia or akathisia is present. If either condition is diagnosed, the proper steps can be taken. Further, it should be noted that these effects on mentation occur so rarely—although the accompanying motor effects may be more common—that they did not prevent most studies from showing a positive or neutral effect of the drugs.

V. Conclusion

A comparison between the rulings in recent criminal cases and the right-to-refuse-treatment cases analyzing the effects of antipsychotic drugs indicates that the former generally display a more accurate understanding of antipsychotic medications. The decisions in the criminal cases emphasized the restorative effects of the medication and typically failed to find any adverse effects on mental functioning. The right-to-refuse-treatment cases, on the other hand, downplayed the medication's positive effects, highlighted side effects, and created largely unwarranted concerns about possible negative impacts on mentation. Although a more realistic view of the effects of antipsychotic medications would not necessarily preclude courts from finding a constitutional right to refuse treatment, the rationale of many of the opinions—grounded as they are in the rights to freedom of thought, liberty, and privacy—might well seem less convincing if the spectre of "mind control" were dispelled. Regardless of whether the holdings would be altered, it is difficult to disagree that the opinions should be based on an accurate view of the effects of the drugs.

It is hoped that courts, which in the future will have to grapple with the question of the effects of antipsychotic drugs on mentation, will pay heed to the substantial body of experimental data in this area reviewed herein as the starting-point for their deliberations. In so doing, the legal analysis which flows from these courts' medical observations can only be more firmly grounded upon both factual and legal truths.