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# Interlibrary Loan and Resource Sharing: The Economics of the SUNY Express Consortium

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## ABSTRACT

THIS ARTICLE PRESENTS AN ECONOMIC ANALYSIS of the SUNY Express consortium and the potential savings from consortium delivery of scholarly articles and joint collection development. An economic model of consortium collection development is presented. Data on the cost of interlibrary loan, journal prices, and journal use are provided to determine the potential savings of the SUNY Express consortium. While considerable savings are possible using consortium delivery of scholarly journal articles, savings from joint collection development are small.

## INTRODUCTION

Resource sharing is considered by many librarians to be a solution to the financial problems within the academic library community which include the continued rise in journal prices. The causes of journal price escalation are outlined in Tenopir and King (1996) and Kingma and Eppard (1992), among others. These price increases have forced many academic libraries to cut journal subscriptions. Typically, high-priced low-used journal subscriptions in the sciences and mathematics are targeted as the major culprits in the journal price escalation. Cutting a few major science journals provides significant savings to any academic library, although it may also impact the quality of the academic programs which depend on these subscriptions.

Library consortia are considered as a possible solution to these financial problems. Consortium delivery may provide lower cost and higher quality access to scholarly information than journal subscriptions and

commercial document delivery services, although the cooperative nature of a consortium may lead to bureaucratic problems of finance and implementation. Many of the benefits and costs of library consortia are discussed in Eaton (1995), Hirshon (1995), Hightower and Soete (1995), and Lowry (1990).

While consortium savings have been mentioned in the library literature, there has been little modeling of the economics of library consortia including the costs and benefits of joint collection development and the costs of consortium delivery of journal articles. In addition, a complete economic analysis requires modeling not only the financial costs and benefits to the libraries within the consortium but also the costs and benefits to library patrons of consortium services. Providing access to journal articles via a consortium service instead of subscribing to a journal requires patrons to wait for access. This time spent waiting has an opportunity cost to patrons which should be measured and incorporated into any economic analysis of consortium delivery.

#### AN ECONOMIC MODEL OF A LIBRARY CONSORTIUM

In theory, a consortium of libraries which offers members joint collection development and priority access to interlibrary loan can provide savings to library members relative to commercial document delivery, traditional interlibrary loan, and journal subscriptions. There are two sources of potential financial savings for libraries within the consortium. First, if consortium delivery can be achieved at a lower cost than alternative sources of interlibrary loan and document delivery, then libraries within the consortium will save on interlibrary loan services. In addition, if libraries within the consortium identify journal subscriptions for which access can be more efficiently provided by the consortium sharing a subscription rather than every library within the consortium owning one, then consortium delivery and joint collection development can be economical.

#### THE ECONOMICS OF ACCESS VERSUS OWNERSHIP

The first source of potential savings from consortium delivery comes from the lower cost of access via consortium delivery than from other sources of delivery or purchasing a journal subscription. This source of savings only occurs if consortium delivery is the lowest cost method of access. If traditional interlibrary loan delivery via the OCLC network or a commercial service such as UnCover costs less than consortium delivery, there would be no reason to use a higher cost method of delivery.

If consortium delivery is chosen, each library within the consortium must decide whether to subscribe to a particular journal or provide access to their patrons via the consortium. To determine these potential savings, it is first important to understand the basic decision of access

versus ownership when another library within the consortium will be subscribing to the journal. Getz (1991), Kingma (1996), and Palmour et al. (1977) illustrate the library decision rule for access versus ownership.

The decision of providing access via interlibrary loan versus ownership of a journal subscription is shown in figure 1. The figure illustrates the "break-even" level of use and subscription price which makes ownership of a journal subscription more economical than providing access by interlibrary loan. In figure 1, the horizontal axis represents the present discounted value of the expected lifetime use of a single year's subscription to a particular journal. The value of a journal subscription is not only the benefit from this year's use of the journal but also of all future years' uses. This year's subscription to this journal may generate twenty uses this year and ten uses next year for this year's subscription. If the subscription was never used again, in total this journal would have thirty nondiscounted lifetime uses. Discounting future uses by an appropriate discount rate to reflect the present value of these uses would result in a present discounted value of expected use less than thirty.

The vertical axis in figure 1 represents the total cost of a journal subscription—the subscription price plus fixed costs—or the total costs of access by interlibrary loan for a single volume or year of a journal. Fixed and marginal costs of journal subscriptions and interlibrary loan

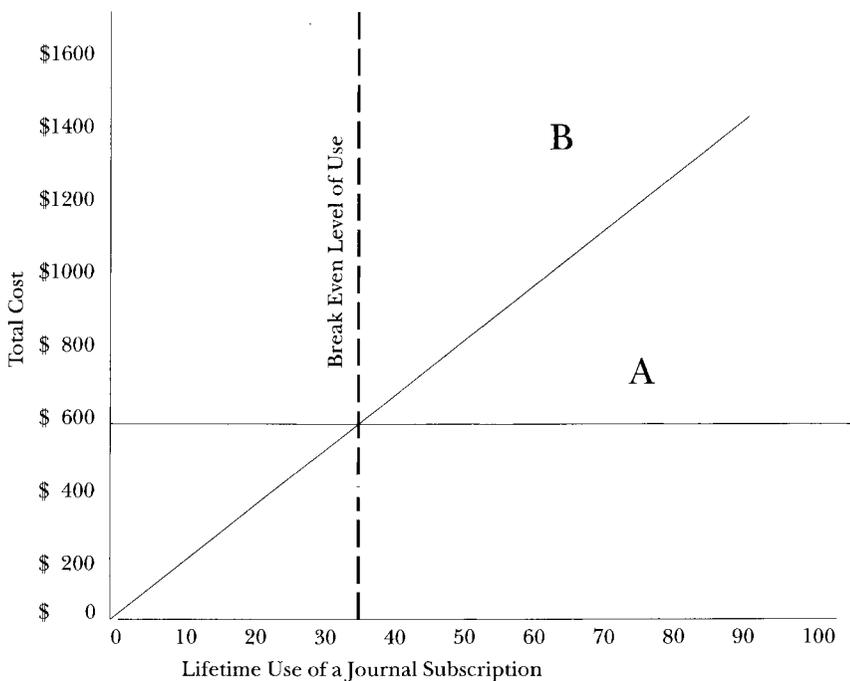


Figure 1. Library's Decision Rule to Subscribe or Borrow

are taken from Kingma (1996). A journal with a subscription price of \$500 and \$63 in fixed costs of shelving and processing is illustrated by the vertical line "A." Line *A* assumes the marginal costs of using a journal subscription equals \$0.94 per use which includes the cost of reshelving the journal (\$0.07) and the expected cost of a photocopy of the article (\$0.87). Line "*B*" represents the costs of providing access to journal articles by interlibrary loan. Each delivery by interlibrary loan costs the lending and borrowing libraries resources plus has an opportunity cost to the patron of having to wait for access to the article. Line *B* assumes the marginal cost of interlibrary loan to be \$16.47 per request.

The break-even level of use is the present value of the level of expected lifetime use such that the cost of providing access by interlibrary loan equals the cost of providing access by purchasing a journal subscription. In figure 1, this is thirty-five uses. If the expected lifetime use of this journal is less than thirty-five, it is economically efficient to provide access by interlibrary loan rather than by purchasing a journal subscription. If expected lifetime use is thirty-five or greater, then it is economically efficient to purchase a subscription to this journal.

The break-even level of use depends on the costs of interlibrary loan, the price of a journal subscription, the number of expected lifetime uses, and the costs of in-house use of the journal. As the full cost of interlibrary loan increases, the break-even level of use decreases, making ownership more efficient. Likewise, as the costs of ownership increase, the break-even level of use increases, making access more efficient over a greater level of lifetime use. As journal prices continue to escalate, access by interlibrary loan or document delivery becomes more cost efficient leading to additional journal subscription cancellations and an increased use of interlibrary loan and document delivery.

#### THE ECONOMICS OF CONSORTIUM ACCESS VERSUS CONSORTIUM OWNERSHIP

In theory, a group of libraries can form a consortium and develop their journal collections jointly to provide savings to the group. There are two potential sources of savings; the savings from consortium delivery which may be at a lower cost than other methods of delivery, and the savings from the consortium owning a single copy of a journal in order to provide access to it by other members of the consortium.

The first source of potential consortium savings assumes that the group of libraries in the consortium can provide delivery at a lower cost than alternative sources. The consortium may use more student labor for consortium delivery than for traditional interlibrary loan or the consortium may ask patrons to search the catalogs of other libraries within the group, saving staff time in locating journal subscriptions at other libraries. Geography may also play a role in lowering shipping and delivery

costs. However, while geographic closeness may play a role in lowering the cost of consortium delivery of monographs, delivery of journal articles by facsimile and Ariel implies that geography has little to do with lowering the costs of delivery for journal articles.

The second potential source of savings from consortium delivery comes from joint collection development by consortium members. There are many journal titles for which patron use is too low to justify a subscription at an individual library. However, many of these titles might generate sufficient use among all the libraries within the consortium to justify the consortium purchasing a subscription. In this case, one library within the consortium might purchase a subscription, perhaps financed by a subsidy from other libraries within the consortium, and provide access to patrons at other member libraries.

This decision rule by the consortium to subscribe is illustrated in figure 2. The horizontal axis in this figure shows the expected level of lifetime use by all members of the consortium. The vertical axis represents the total cost of providing access to a journal by a subscription, consortium delivery, or an alternative method of delivery. Line "A" represents the cost of a subscription to this particular journal. Figure 2 assumes that this journal has the same subscription price and other costs as in figure 1. Line "C" represents the cost of consortium delivery to the member libraries. Line *C* assumes that the marginal cost of consortium delivery is \$7.80 per article. Line "B" represents the cost of delivery of articles from this journal by an alternative method of access with a higher marginal cost of delivery per article than the consortium's marginal cost. Line *B* assumes that the marginal cost of the alternative method of delivery is \$16.47.

In figure 2, library number one's expected level of lifetime use is twenty uses. Libraries two, three, four, and five have an expected lifetime use of ten uses each. Given library one's level of use, this library would not subscribe to this journal if it were not a member of the consortium. However, given twenty expected lifetime uses of this one-year subscription, the cost of delivery by the alternative method of delivery is \$329.

We can determine the cost of consortium subscription and delivery using line *C*. If libraries one and two were the only members of the consortium, it would not be worthwhile for this two-library consortium to subscribe to the journal. The cost of consortium ownership and access would be \$563 for library one and \$97 for library two's access. Together the cost to the consortium of \$660 would exceed providing access to the journal through the alternative method of delivery. Line *B* shows that the thirty uses generated by library one and library two would cost \$494 by the alternative method of delivery. Only if all five libraries are members of the consortium does consortium ownership and delivery cost less than the alternative method of delivery. In this case, the sixty expected

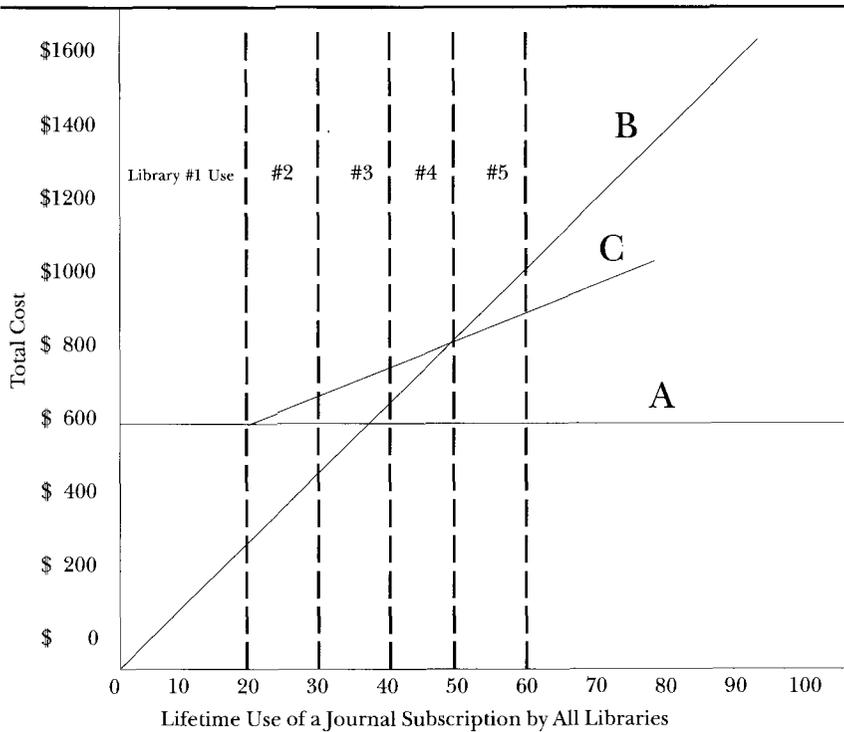


Figure 2. Consortium's Use of a Journal Subscription by All Libraries

lifetime uses of all five libraries costs \$894 for consortium ownership and delivery. However, these sixty uses cost \$988 by the alternative method of delivery.

The break-even point of consortium delivery is the level of cumulative expected lifetime use by the members of the consortium such that consortium ownership and delivery costs less than the alternative method

Table 1. The Cost of Access to Scholarly Articles at a Research Library

	Borrowing	Lending	Patron*	Total
ARL/RLG average cost estimate*	\$18.62	\$10.93	\$1.68	\$31.23
UnCover	\$13.92	---	\$1.68	\$15.60
SUNY Express Consortium*	\$3.92	\$3.21	\$1.68	\$8.81

\*Notes: Patron costs include the opportunity cost of time spent waiting for delivery minus the value of the photocopy received without charge. For the ARL/RLG average cost estimate, see Roche (1993). SUNY Express consortium is now called Empire Express.

of delivery. In figure 2, the break-even level of use for consortium delivery is forty-nine uses. If the cumulative use of the members of the consortium is forty-nine or more, it is more economical to provide access by consortium ownership and delivery.

There are several assumptions used in figure 2 that are important to note. First, if the alternative method of delivery has a marginal cost of delivery less than the consortium's marginal cost, then there is no reason to provide access by the consortium. In other words, a consortium is worthwhile only if it provides a lower cost method of delivery. Second, if a library within the consortium would subscribe to a journal regardless of whether it is a member of the consortium, then consortium ownership is assumed and there is no reason to determine the potential savings for the consortium to purchase this subscription. It is only when no library within the consortium is willing to subscribe to a particular journal title that joint collection development within the consortium becomes relevant. Finally, the level of use by each library within the consortium influences the consortium cost of ownership and access. In figure 2, if library one has a higher level of expected lifetime use, line *C* will shift to the right, and the break-even point of consortium delivery will decrease to something less than forty-nine. Library one as the "subscribing library" within the consortium provides savings relative to other methods of delivery for every use, therefore the level of use at library one increases the savings from consortium ownership and delivery and lowers the break-even level.

While theory predicts that there may be some journal titles for which joint collection development is economically efficient, there are no estimates of the potential benefit from joint collection development for academic libraries. In addition, it is unclear whether consortium delivery is at a lower cost or whether other methods of delivery might provide similar levels of access at a lower cost.

### SUNY EXPRESS AND THE COST OF INTERLIBRARY LOAN

In 1994, the University Libraries of the State University of New York at Albany, Binghamton, Buffalo, and Stony Brook received funding from the Council on Library Resources to do a cost analysis of access versus ownership for low-use high-cost journal titles in mathematics and the sciences. Kingma (1996) reports the results of this project.

This study provides guidelines to assist academic libraries in their decisions on providing access to scholarly articles by ownership or interlibrary loan. This study also provides estimates of the costs of access by the SUNY Express consortium of libraries, commercial document delivery, and traditional interlibrary loan. A selection of these cost estimates is shown in table 1.

Table 1 shows the full economic cost of access. This cost includes the financial cost to the borrowing library, the financial cost to the lending

Table 2. The Potential Savings from Canceling Journal Titles in Mathematics and the Sciences at a Research Library

	Decision Rule to Cancel		
	ARL/RLG Average Cost of ILL	UnCover Cost Estimate	SUNY Express Cost Estimate*
Number of Titles for which Access is Economically Efficient Relative to Ownership	453	565	218
Mean Price of Canceled Titles	\$1,140	\$1,082	\$839
Mean Number of Uses of Canceled Titles	14	19	29
Savings from Canceled Subscriptions	\$545,243	\$647,393	\$197,030
Added Cost of Interlibrary Loan	\$113,824	\$158,092	\$ 51,386*
Opportunity Cost to Patrons	\$10,270	\$17,801	\$10,623
Financial Cost to Lending Library	\$66, 815	--	\$20,297
Total*	\$354,334	\$471,500	\$114,724

\*Note: SUNY Express Cost Estimate is based only on journal titles for which one of the other four SUNY Express libraries would retain a subscription. The additional costs of interlibrary loan for SUNY Express include \$26,600 in copyright clearance fees assuming a \$5 charge for every article over 5 articles requested from the same journal title. Total economic savings assumes savings relative to purchasing a journal subscription.

library, and the opportunity cost to the patron. The opportunity cost to a patron is the value of the time spent waiting for delivery of the information rather than having immediate "on-the-shelf" access to a journal subscription and having to pay for a photocopy of the article. This opportunity cost of access was measured by surveying interlibrary loan patrons about their willingness to pay for priority delivery of journal articles. On average, patrons were willing to pay \$2.55 for immediate access to the journal article. The value of a "free" photocopy of the journal article was calculated at an average of \$0.87 per article. The opportunity cost to library patrons of interlibrary loan relative to a journal subscription is \$2.55 minus \$0.87. Table 1 also assumes that the opportunity cost to patrons for the different methods of delivery is the same since the difference in the days for delivery between these three sources is trivial. The

cost of delivery for UnCover is included in the delivery fee charged to the borrowing library.

Using these cost estimates, the potential savings from canceling journal subscriptions can be estimated. These savings estimates are based on a journal use study conducted in 1992 for journals at the University Libraries at the State University of New York at Albany, Binghamton, Buffalo, and Stony Brook. Funding for this study was also provided by the Council on Library Resources. Journal use for the entire journal run of each journal title is used to proxy for the expected future use of a journal subscription. In other words, present use is employed as an estimate of this year's use of the current journal subscription. Present use of a one-year old journal subscription is used to proxy for the expected use of the current journal subscription in one year—i.e., when that journal is one-year old. Data on journal prices were previously collected at the Library of the University at Albany and were cross-matched with the journal use database. The level of use, journal price, and cost of delivery were used to identify journal titles in the database for which interlibrary loan provides a more cost-efficient method of access than a subscription. Table 2 shows potential savings from canceling these journal subscriptions.

Table 2 uses three different cost estimates for a decision rule to cancel journal titles: (1) the ARL/RLG average cost estimate, (2) the cost of UnCover, and (3) the cost of delivery by the SUNY Express consortium. If the ARL/RLG cost estimate is used, there were 453 journal subscriptions in 1992 that could have been more economically provided by interlibrary loan. The estimated financial savings from canceling these journal titles is \$545,243. This estimate includes the savings from canceled journal subscriptions and the fixed and marginal costs of these subscriptions. The added cost of providing access by interlibrary loan is \$113,824 while the opportunity cost to patrons of waiting for access is \$10,270. The additional cost to the lending libraries is \$66,815. The total economic savings from canceling these journal titles would be \$354,334 per year.

Using the lower cost estimate for delivery by UnCover, there are an additional 112 titles that could be canceled. The total economic savings from providing access by UnCover rather than by journal subscription is \$471,500.

While the marginal cost estimate for SUNY Express is lower than the marginal cost of UnCover, not all of the titles to be canceled would be available at one of the other three SUNY Express libraries. Only 218 titles could be canceled and more efficiently delivered by another SUNY Express library. However, the lower marginal cost of delivery by SUNY Express implies that some titles which would not be canceled if UnCover were used as the method of delivery would be canceled if SUNY Express were used as the method of delivery. The SUNY Express consortium

Table 3. Consortium Savings and Joint Collection Development.

	SUNY Express		
	All Titles	Titles Such that Another Library Would Retain a Subscription	Titles Such that Joint Collection Development is Economically Efficient
Number of Titles	218	185	33
Mean Price	\$839	\$899	\$503
Mean Number of Lifetime Uses	29	30	25
Number of Titles with Number of Uses Greater than Five	186	156	30
Financial Savings to borrowing Library of SUNY Express Relative to Purchasing a Journal Subscription	\$145,644	\$133,355	\$12,288
TOTAL Economic Savings to the University at Albany of SUNY Express Relative to Purchasing a Journal Subscription	\$114,724	\$106,392	\$8,332
TOTAL Economic Savings to All Libraries within the SUNY Express Consortium of Consortium Delivery Relative to UnCover	\$47,239	\$30,528	\$16,711

provides reliable, timely, and high-quality access to journal articles at a lower marginal cost to SUNY Express libraries than UnCover.

For these 218 titles, there is a potential savings of \$197,030 from canceled journal subscriptions. The added cost includes the cost of SUNY Express delivery of \$51,386 of which \$26,600 would be copyright clearance fees associated with use in excess of five per year. This assumes that there is a copyright clearance fee of, on average, \$5 per article and that all use in excess of five per year would qualify for a copyright payment. In addition, there would be an opportunity cost of \$10,623 to patrons waiting for delivery and a financial cost of \$20,297 to the lending libraries

within the SUNY Express consortium. In total, the economic savings of SUNY Express would be \$114,724 per year for the university library.

Table 2 shows that, regardless of the method of delivery, the level of potential savings from canceling journal subscriptions in mathematics and the sciences and providing access by interlibrary loan are significant.

The other potential source of savings from consortium access comes from joint collection development. Joint collection development may provide additional savings to these libraries if they can identify the journal titles such that consortium purchase and delivery provides a lower cost method of access.

Table 3 shows the savings from joint collection development. Of the 218 titles for which consortium delivery provides the lowest cost method of access, 185 titles would have been subscribed to by a library within the consortium other than the University at Albany. For these 185 titles, there is no need for joint collection development because at least one library would not have canceled their subscription. These titles have a mean lifetime use of thirty. Of the 185 titles, 156 have a lifetime use of over five. While this level of use is high, the mean subscription price of \$899 makes it more economical for the University at Albany to provide access by consortium delivery rather than by purchasing a subscription.

Of the 218 titles, there are thirty-three titles for which it is worthwhile for the SUNY Express consortium to consider joint collection development. If these libraries were not members of a consortium, it is more economically efficient for each library to cancel these thirty-three titles and provide access to their patrons by interlibrary loan. However, the level of use within the consortium makes it more economical for the consortium to purchase these subscriptions and provide access to the member libraries. The lower cost of consortium delivery relative to UnCover for the libraries which do not own the subscription, along with the lower cost to patrons of having access within the library which does own the subscription, offsets the subscription price and other costs of ownership.

However, while there exists a set of titles for which joint collection development is worthwhile, the potential savings from having the consortium purchase these titles relative to providing access by UnCover is only \$16,711 per year. This is the total economic savings to the four libraries within the SUNY Express consortium of purchasing these thirty-three subscriptions. The savings per library is \$4,175 per year.

While these savings are real, it is unlikely that they are sufficient to cover the costs of joint collection development. Joint collection development within the consortium would require staff time and other library resources. In addition, there are managerial problems of financing journal titles purchased by one library for the use of the other members of the consortium, even though the "subscribing" library would not otherwise subscribe to the journal.

## CONCLUSION

Library consortia can provide a lower cost method of delivery of scholarly journal articles. This article has shown that, for the academic libraries which participated in this study, consortium savings are significant and an increased use of consortium delivery and decrease in the number of journal subscriptions is worthwhile. However, savings from a decrease in journal subscriptions must be used, in part, to finance the expected increase in demand for interlibrary loan by library patrons.

In theory, joint collection development by consortium libraries may provide additional savings. However, for the libraries in the SUNY Express consortium, the potential savings from joint collection development are limited and may not be sufficient to cover the costs of coordinating consortium collection development.

Of course, if all academic libraries were to cancel significant numbers of journal titles, publishers would stop publishing some titles and increase prices on other titles in order to cover the lost revenues from journal cancellations. However, it is not good management policy for an individual library or library consortium to purchase low-use, high-cost journal subscriptions in order to prevent publishers from raising prices or ending publication of titles. Economic analysis dictates that the market equilibrium in the supply and demand for scholarly journals should be determined by individual libraries, library consortia, and publishers maximizing the benefit to their patrons, member libraries, and stockholders. If consortium delivery, commercial delivery, other methods of delivery, or electronic journals provide a lower cost method of access to scholarly articles, it is sound management for academic libraries and library consortia to cancel low-use subscriptions and provide patrons access by these other methods.

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